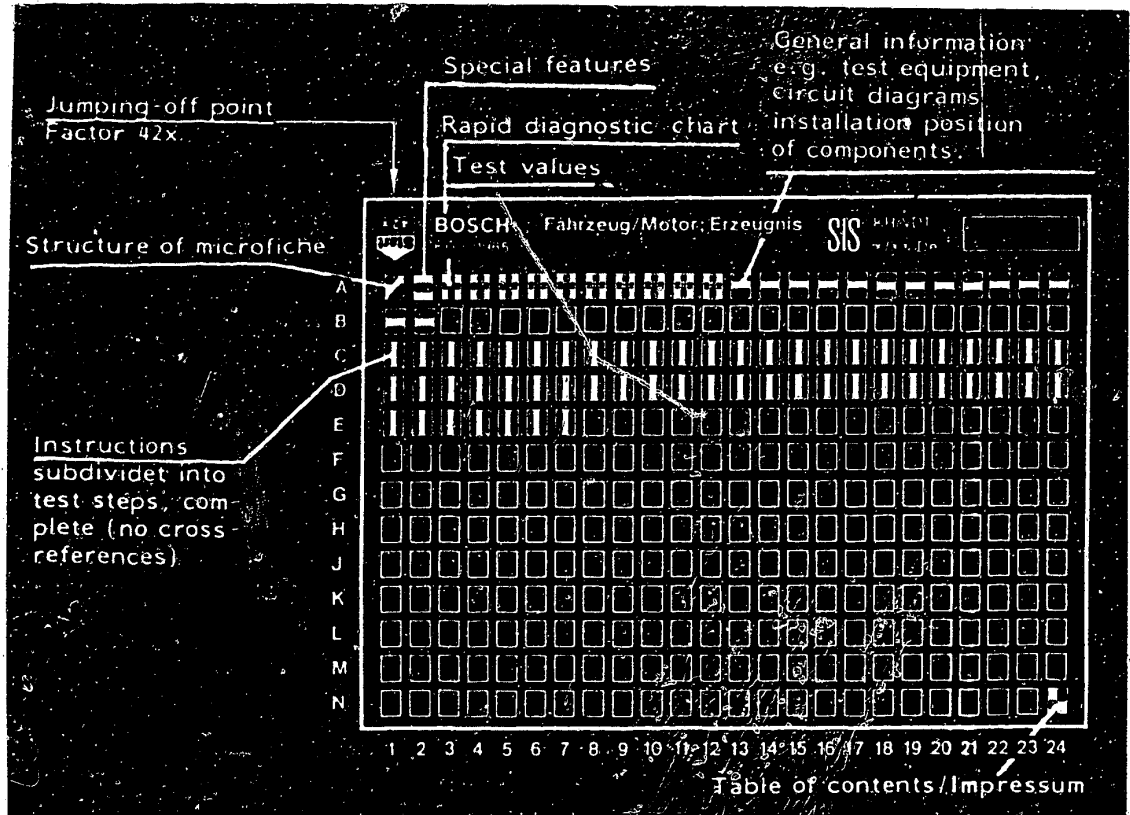


Structure of microfiche

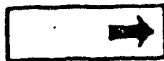


1. Read from left to right
2. Title of microfiche (appears on each coordinate)

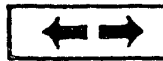
E16	Product/component/test step
	Vehicle/engine

Coordinate

3. Limits of section



Beginning



Mid-section



End



One-page section

4. References to relevant test steps in test specifications; coordinate e.g. C6

C6

A1	Repair and testing	
-----------	--------------------	--

1. Special features

This microcard contains the revised testing and repairing of the electronic automatic heating and air-conditioning system (Tempmatik) in Mercedes-Benz vehicles as of 9.81

Type W 126: 280 S, 280 SE, 280 SEL
380 SE, 380 SEL
500 SE, 500 SEL

Type C 126: 380 SEC
500 SEC

Type R 107: 208 SL
380 SL
500 SL

This microcard supersedes edition
MB-00/E61 of 5.1982.

As of mid-1984 vehicle types W 126, C 126 have been provided with an additional evaporator temperature sensor in the evaporator housing.



2. Rapid diagnosis chart for heating and air conditioning test adapter

The following rapid diagnosis chart makes it possible for the experienced expert to quickly check the system with test adapter KDHK 0001.

This chart is limited to the following:

- Sequence of test steps
- Switch settings on adapter
- Test information and test specifications (reading on adapter)
- Reference to coordinates of the respective detailed testing and trouble-shooting program

If detailed information and instructions are required, always proceed according to the troubled-shooting program starting on Coordinate B1.

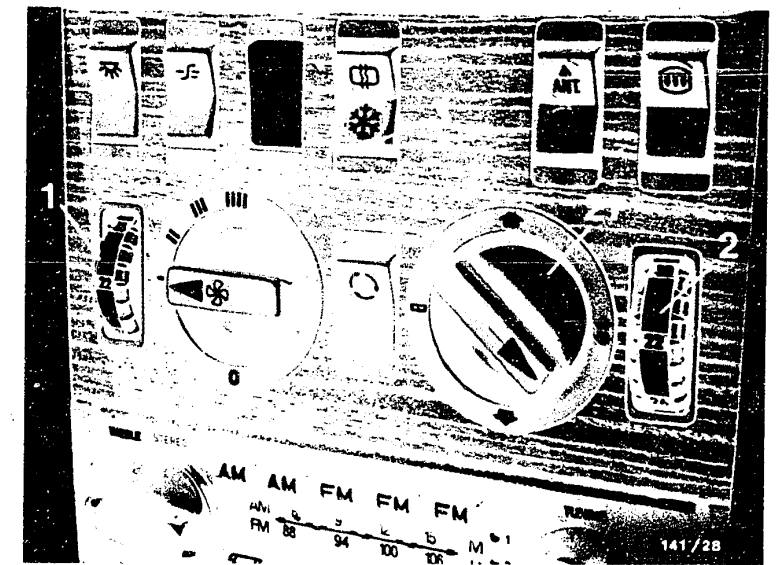
Make sure of the following before testing:

- Check the customer complaint (check operation of automatic heating and air conditioning system according to owner's manual)
- Coolant level O.K.
- Refrigerant level O.K.
- Engine running and at operating temperature
- Electrical system (fuses, battery voltage) O.K.
- Blower switch at position IIII or blower running at max. speed
- Left-hand and right-hand temperature selector knobs approximately at center position (22)
- Air-distributor switch on vehicle at footwell position
- Fresh air/recirculating-air switch at fresh air position
- Air-conditioning switch at position "a" (refrigerant compressor on)

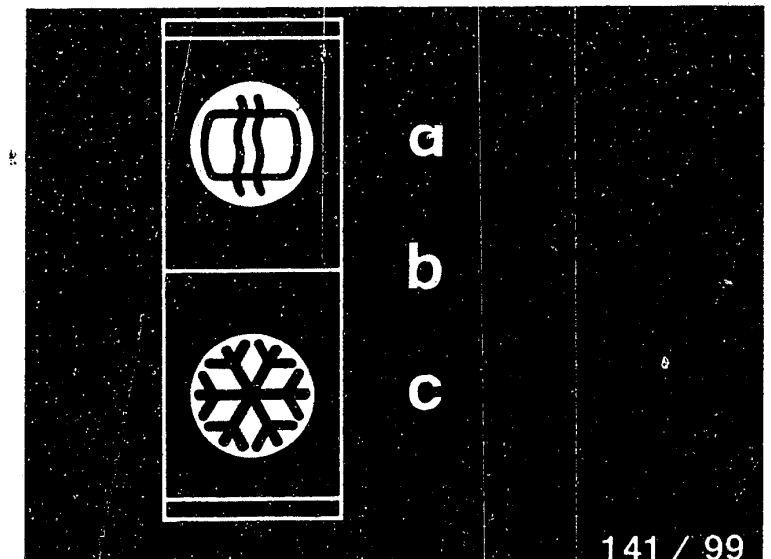
The ignition must be off when disconnecting plug connectors.

Note:

Test step 11 does not apply for vehicles without evaporator sensor. Test step 12 in the rapid diagnosis chart does not apply to vehicles with evaporator sensor.



- 1 = Temperature selector thumbwheel, left-hand
 - 2 = Temperature selector thumbwheel, right-hand
 - 3 = Air-conditioning switch
 - 5 = Fresh air/recirculated air switch
 - 6 = Blower switch
 - 21 = Air-distributor switch
- Air-conditioning switch
- a = Compressor on
 - b = Compressor off
 - c = Compressor as required



A3

Rapid diagnosis chart
Mercedes-Benz W 126, C 126, R 107



A4

Rapid diagnosis chart
Mercedes-Benz W 126, C 126, R 107



Rapid diagnosis chart for electronic automatic heating and air-conditioning system (Tempmatic)

Test adapter KDHK 0001 with adapter lead KDHK 0016

Test step	Rotary switch position	Testing of	Test instructions	Reading/ test specifications	Coordinate
1	1	Electronic control unit power supply		10 ... 15	C 4
2	2	Passenger-compartment temperature sensor		5 ... 11	C 6
2.1			Spray refrigerant spray into passenger-compartment temperature sensor	Dropping while cooling down	C 8
2.2			With blower operating, check air admission to passenger-compartment temperature sensor (using paper strip)		C 10
3	3	Left-hand temperature selector thumbwheel	Turn temperature selector thumbwheel from end to end. Reading must change uniformly between min. and max. After testing, return temperature selector thumbwheel to center position (22).	approx 1.5...8 min. 1 appr. max. 9 appr.	C 12
4	4	Right-hand temperature selector thumbwheel	Turn temperature selector thumbwheel from end to end. Reading must change uniformly between min. and max. After testing, return temperature selector thumbwheel to center position (22).	approx 1.5...8 min. 1 appr. max. 9 appr.	C 14

A5

Rapid diagnosis chart

Mercedes-Benz W 126, C 126, R 107



A6

Rapid diagnosis chart

Mercedes-Benz W 126, C 126, R 107



Rapid diagnosis chart for electronic automatic heating and air-conditioning system (Tempmatic)

Test adapter KDHK 0001 with adapter lead KDHK 0016

Test step	Rotary switch position	Testing of	Test instructions	Reading/ test specifications	Coordinate
5	6	Heating water pump	(Heating water pump is standard on type R 107 and all 8-cyl. models). Return blower switch to position I. Switch off engine. Switch on ignition. Switch on auxiliary switch (S) on test adapter: <u>Heating water pump operating</u> - check by feeling/listening.	0 ... 3	C 16
5.1			Switch off auxiliary switch (S) on test adapter. <u>Heating water pump not operating</u> - check by feeling/listening.	9 ... 14	C 18
6	7	Left-hand heating water valve	Switch on auxiliary switch (S) on test adapter. <u>No heating effect on left</u> - check by feeling.	0 ... 3	C 20
6.1			Switch off auxiliary switch (S) on test adapter. <u>Heating effect on left</u> - check by feeling.	9 ... 14	C 22
7	8	Temperature sensor on left-hand heat exchanger	Test step to follow directly after 6.1 (water in heat exchanger must be hot at start of test).	7 ... 12 slowly falling	D 1

A7

Rapid diagnosis chart
Mercedes-Benz W 126, C 126, R 107



A8

Rapid diagnosis chart
Mercedes-Benz W 126, R 107



Rapid diagnosis chart for electronic automatic heating and air-conditioning system (Tempmatic)

Test adapter KDHK 0001 with adapter lead KDHK 0016

Test step	Rotary switch position	Testing of	Test instructions	Reading/ test specifications	Coordinate
8	9	Right-hand heating water valve	Switch on auxiliary switch (S) on test adapter. <u>No heating effect on right</u> - check by feeling.	0 ... 3	D 5
8.1			<u>Switch off</u> auxiliary switch (S) on test adapter. <u>Heating effect on right</u> - check by feeling.	9 ... 14	D 7
9	10	Temperature sensor on right-hand heat exchanger	Test step to follow directly after 9.1 (water in heat exchanger must be hot at start of test).	7...12 slowly falling	D 9
10	13	Air-conditioning switch	Start engine. Air-conditioning switch at position "a" (refrigerant compressor on)	10 ... 15	D 13
10.1			Air-conditioning switch at center position "b" (refrigerant compressor off)	0 ... 3	D 15
10.2			Air-conditioning switch at position "c" (refrigerant compressor as required)	0 ... 3	D 17
11 ¹⁾	5	Compressor clutch, evaporator temperature sensor	Air-conditioning switch at position "a" (refrigerant compressor on as required)	5 ... 12	D 19
11.1 ¹⁾			Press button (T) on test adapter: Compressor operating - intake air is greatly cooled - check by feeling.	slowly falling	D 21

¹⁾ Test step 11 not applicable for vehicles without evaporator temperature sensor

A9

Rapid diagnosis chart

Mercedes-Benz W 126, C 126, R 107



A10

Rapid diagnosis chart

Mercedes-Benz W 126, C 126, R 107



Rapid diagnosis chart for electronic automatic heating and air-conditioning system (Tempmatic)

Test adapter KDHK 0001 with adapter lead KDHK 0016

Test step	Rotary switch position	Testing of	Test instructions	Reading/ test specifications	Coordinate
12 ¹⁾	14	Compressor clutch	Air-conditioning switch at position "a" (refrigerant compressor on) Blower switch at position IIII Press button (T) on test adapter: Compressor operating - intake air is greatly cooled - check by feeling.		D 23
13	15	Compressor clutch supply voltage	Air-conditioning switch at position "b" (refrigerant compressor off)	0 ... 3	E 1
13.1			Air-conditioning switch at position "c" (refrigerant compressor is switched on as required)	10 ... 15	E 3
13.2			Air-conditioning switch at position "a" (refrigerant compressor on)	10 ... 15	E 5

1) Test step 12 not applicable for vehicles with evaporator temperature.

3. General introduction

Automatic heating and air-conditioning system

The passenger compartment temperature is controlled via the electronic control unit, via a resistor chain, comprising two controllable resistors in the left-hand and right-hand temperature selector thumbwheels, and also by a passenger-compartment temperature sensor, two temperature sensors on the heat exchanger and, since 11.84, a temperature sensor on the evaporator with temperature-sensitive resistors.

By turning the temperature selector thumbwheel the resistance is changed by the built-in potentiometer. The passenger-compartment temperature sensor and the temperature sensors on the heat exchanger change their resistance according to the ambient temperature. This total resistance value is compared in the electronic trigger box.

The passenger compartment is heated or cooled accordingly. The passenger-compartment temperature sensor is connected by a hose to the air nozzle on the blower box. When the blower is running, air is drawn in through the opening of the passenger-compartment temperature sensor from the passenger compartment. This flow of air guarantees a shorter response time of the passenger-compartment temperature sensor and thus a high control accuracy of the system. The duo hot-water valve regulates the coolant flow through the heat exchanger. It consists of two solenoid-operated valves which are energized by the trigger box.

The opening/closing times are based on the deviation between the actual and desired temperatures. With the thumbwheel at "MIN" (latched) there is always voltage at the duo heating water valve; it is closed. With the thumbwheel at "MAX" (latched) the duo heating water valve is deenergized and thus fully open.



In addition to the controls of the automatic heating system, the air-conditioning system has an air-conditioning switch with 3 positions.

1. Air-conditioning switch not pressed (centre position = b) = refrigerant compressor off.

In this position only the automatic heating system is in operation, i.e. the inlet air is heated if necessary. If the temperature in the vehicle rises above the set value (set at the temperature selector thumbwheel), untreated outside air is fed into the vehicle.

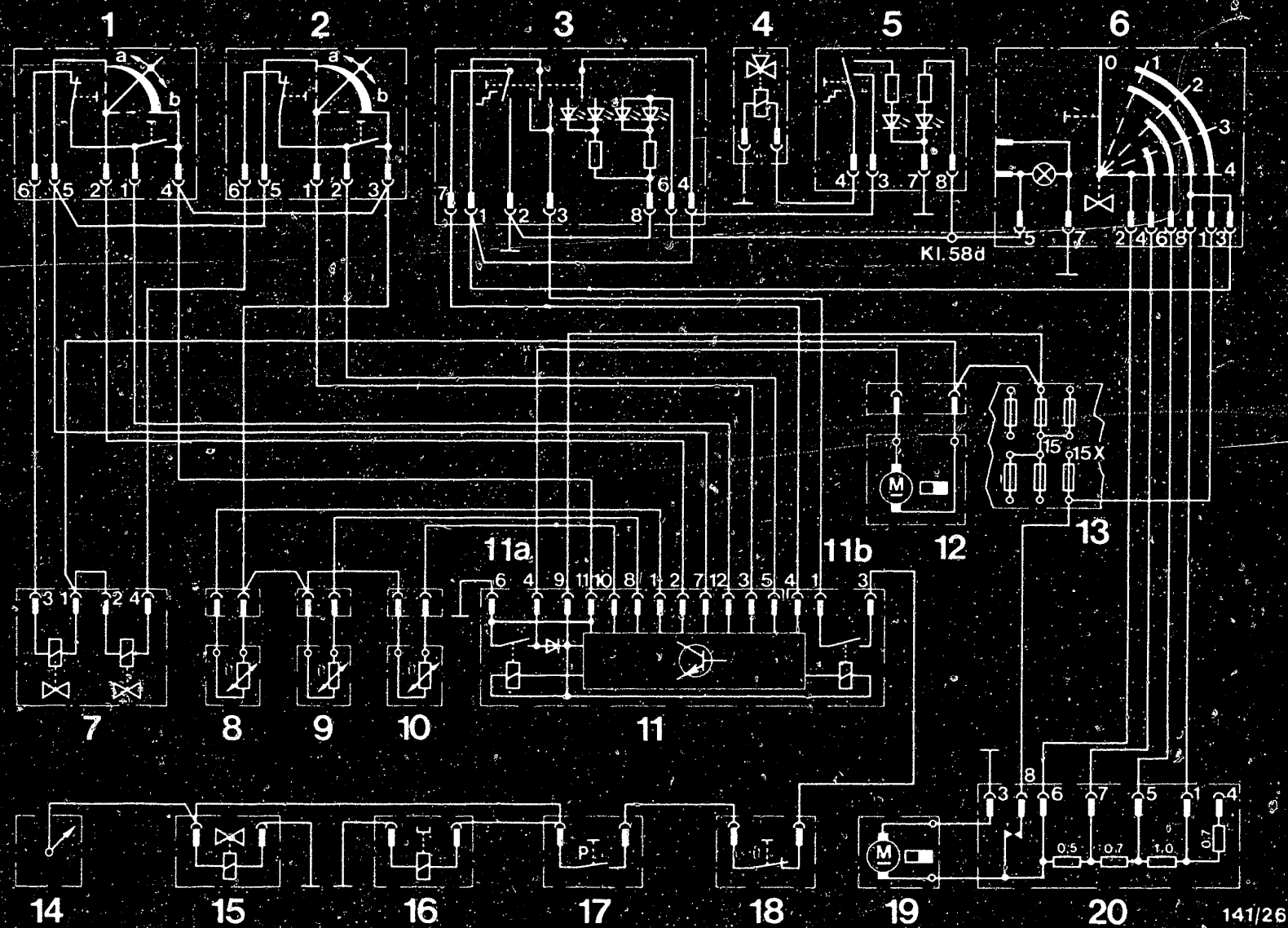
2. Switch symbol "a" pressed = refrigerant compressor on.

In this position the electronic trigger box is overridden and the refrigerant compressor is constantly on (at ambient temperatures above approx. $+4^{\circ}\text{C}$). To prevent the evaporator from icing up, the icing protection switch switches the refrigerant compressor off at an evaporator temperature of $2^{\circ} \pm 1^{\circ}\text{C}$ and switches it on again at approx. $5^{\circ}\text{C} \pm 1^{\circ}\text{C}$. The preselected temperature in the vehicle is regulated by heating. The air from the centre nozzles remains cold. Due to the elimination of the humidity at the evaporator and the re-heating of the air, this operating mode is particularly suitable in damp weather in order to clear misted-up windows. This applies particularly in the case of rain in a damp-hot climate where, due to the high humidity, the tendency of the windows to mist up is so great that they can only be kept clear by drying the air.

3. Switch symbol "c" pressed = refrigerant compressor is switched on as required.

In heating mode the system operates like the automatic heating system. If, however, the temperature in the vehicle rises above the set value, the refrigerant compressor, controlled by the trigger box, begins to operate. Refrigeration is controlled according to the difference between the set value and the actual value.





- | | | | |
|--|--------------------|---|---|
| 1 = Left-hand temperature selector thumbwheel | } a=max.
b=min. | 9 = Temperature sensor on right-hand heat exchanger | 15 = Change-over valve for engine-speed stabilization |
| 2 = Right hand temperature selector thumbwheel | | 10 = Passenger-compartment temperature sensor | 16 = Compressor clutch |
| 3 = Air-conditioning switch | | 11 = Electronic trigger box | 17 = Refrigerant compressor pressure switch |
| 4 = Change-over valve for main air flaps | | 11a = Trigger-box plug (12-pole) | 18 = Icing protection switch |
| 5 = Fresh air/circulated air switch | | 11b = Trigger-box plug (4-pole) | 19 = Blower motor |
| 6 = Blower-motor switch | | 12 = Hot-water pump | 20 = Blower motor series resistor |
| 7 = Duo hot-water valve | | 13 = Main fuse box | |
| 8 = Temperature sensor on left-hand heat exchanger | | 14 = Compressor signal for overrun cutoff | |

4. Basic diagram of Tempmatik without evaporator temperature sensor (control unit no. 1 147 328 019; .. 020; .. 030; .. 031)

A15

Circuit diagram

Mercedes-Benz W 126, C 126, R 107

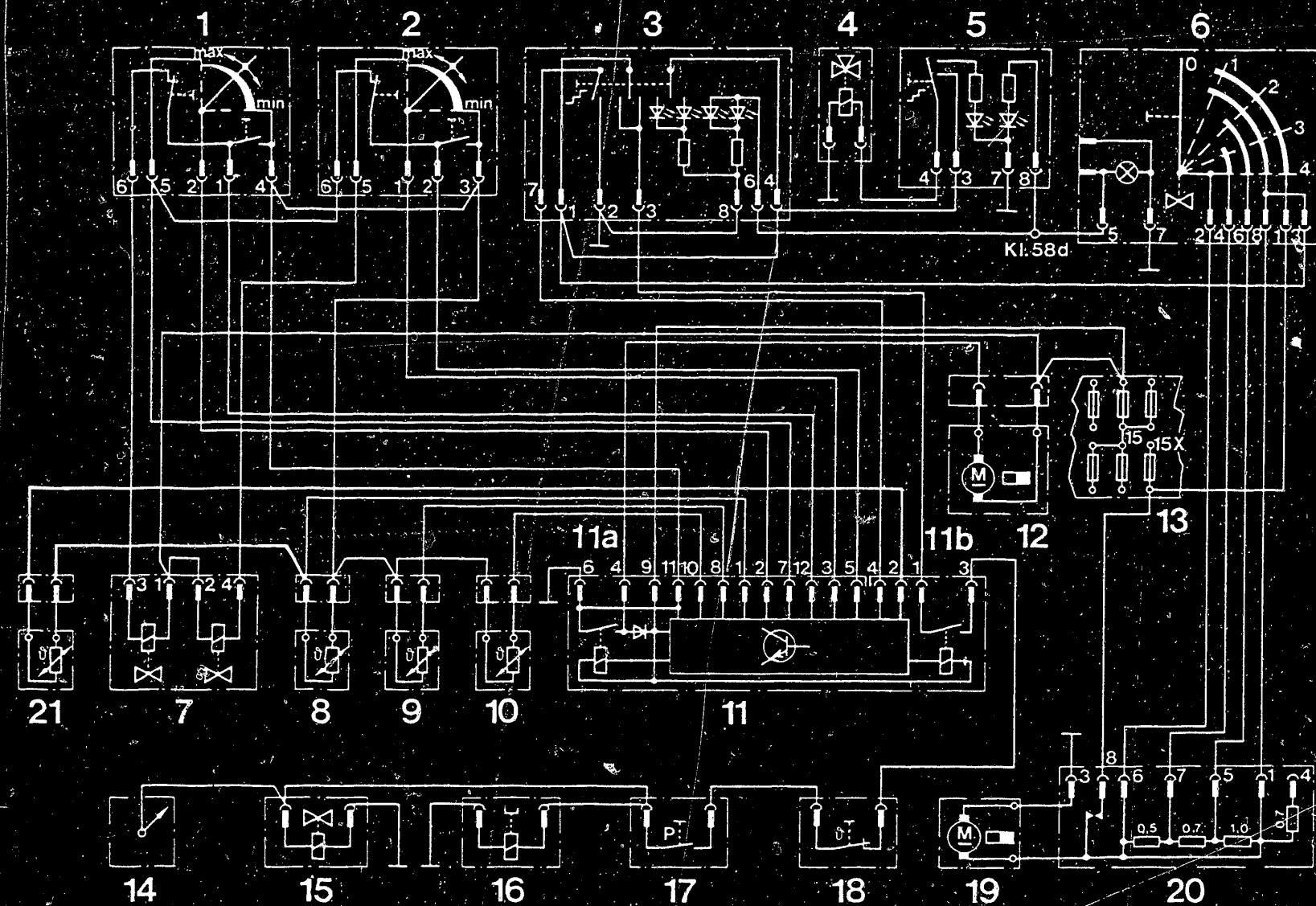


A16

Circuit diagram

Mercedes-Benz W 126, C 126, R 107





141 / 101

- | | | | |
|--|--------------------|---|---|
| 1 = Left-hand temperature selector thumbwheel | } a=max.
b=min. | 9 = Temperature sensor on right-hand heat exchanger | 15 = Change-over valve for engine-speed stabilization |
| 2 = Right hand temperature selector thumbwheel | | 10 = Passenger-compartment temperature sensor | 16 = Compressor clutch |
| 3 = Air-conditioning switch | | 11 = Electronic trigger box | 17 = Refrigerant compressor pressure switch |
| 4 = Change-over valve for main air flaps | | 11a = Trigger-box plug (12-pole) | 18 = Icing protection switch |
| 5 = Fresh air/circulated air switch | | 11b = Trigger-box plug (4-pole) | 19 = Blower motor |
| 6 = Blower-motor switch | | 12 = Hot-water pump | 20 = Blower motor series resistor |
| 7 = Duo hot-water valve | | 13 = Main fuse box | 21 = Evaporator temperature sensor |
| 8 = Temperature sensor on left-hand heat exchanger | | 14 = Compressor signal for overrun cutoff | |

4.1 Basic diagram of Tempmatic with evaporator temperature sensor (control unit no. 1 147 328 038; .. 039)

A17

Circuit diagram

Mercedes-Benz W 126, C 126, R 107



A18

Circuit diagram

Mercedes-Benz W 126, C 126, R 107



5. Testers and tools

Heating and air-conditioning test adapter KDHK 0001

Adapter lead for automatic heating and
air-conditioning system

Multimeter ETE 014.00

or e.g. Pontavi

Refrigerant spray

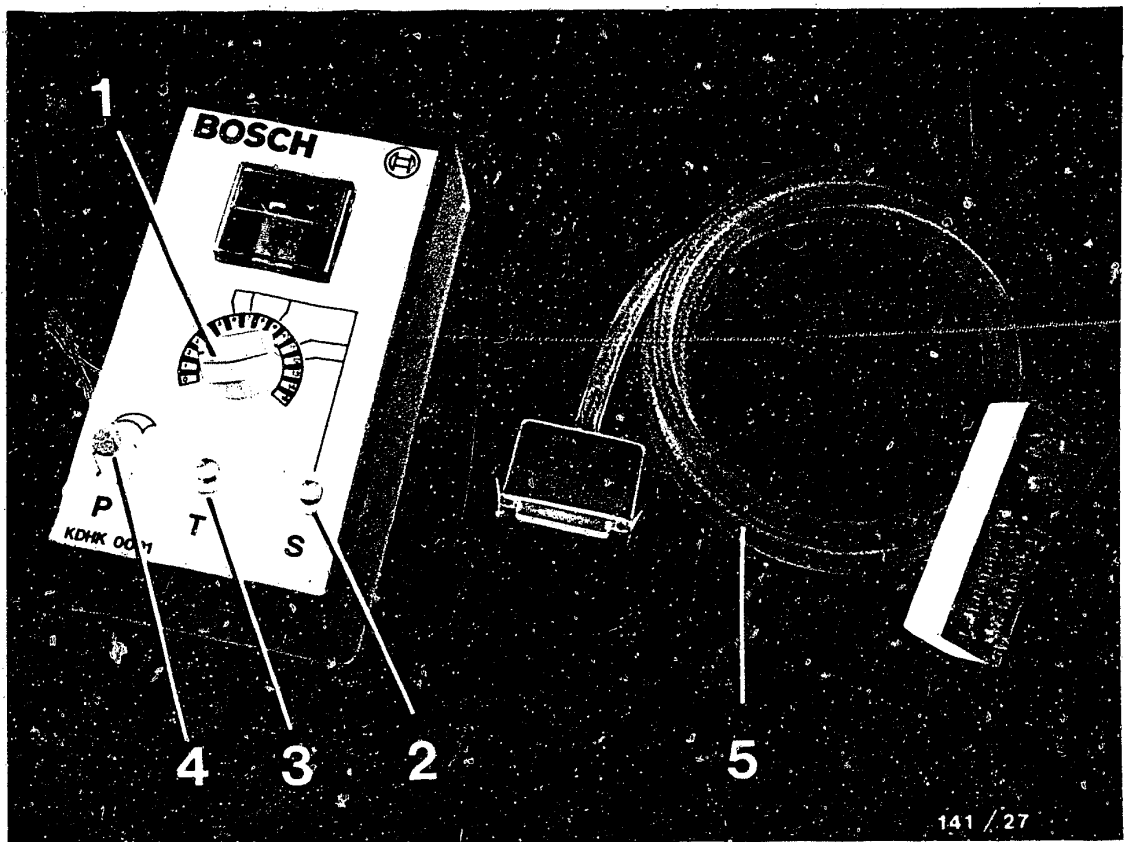
KDHK 0016

0 684 101 400

commercially
available

commercially
available





5.1 Heating and air-conditioning test adapter (KDHK 0001)

- 1 = Rotary switch (S1)
- 2 = Auxiliary switch (S)
- 3 = Push-button (T)
- 4 = Potentiometer (P)
- 5 = Adapter lead for automatic heating and air-conditioning system KDHK 0016



The heating and air-conditioning test adapter is used for checking the peripherals of heating control/air-conditioning systems. The electronic control units are not checked.

Construction

The test adapter is constructed so that, using the rotary switch (S1), the individual components as well as the electric leads are switched on and/or tested one after the other.

Using the auxiliary switch (S), a certain component group can be checked for 2 different functions.

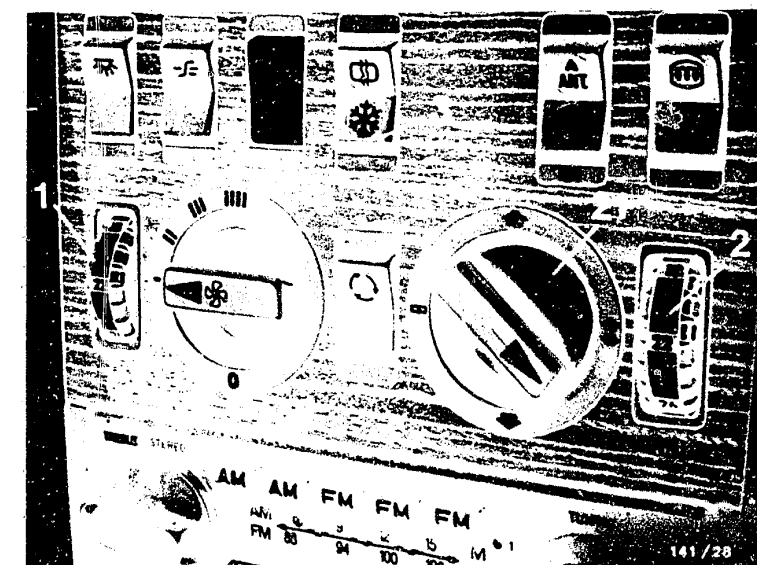
Push-button (T) is used for the brief switching on of the refrigerant compressor.

The potentiometer (P) is not needed for the Mercedes-Benz automatic heating and air-conditioning system (Tempmatik).

The adapter lead KDHK 0016 is used for checking the automatic heating and air-conditioning system.

5.2 Controls for the automatic heating and air-conditioning system (Tempmatik) e.g. in Type W 126, C 126 (see picture).

With the rocker switch (5) it is possible to change over from fresh air intake to circulated air intake, i.e. approx. 80% circulated air and approx. 20% fresh air, e.g. in the case of heavy odor nuisance in city traffic or during nose-to-tail driving.



- 1 = Left-hand temperature selector thumbwheel
- 2 = Right-hand temperature selector thumbwheel
- 3 = Air-conditioning switch
- 5 = Fresh air/circulated air switch
- 6 = Blower-motor switch
- 21 = Air-distributor switch

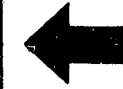
A21

Heating and air-conditioning test adapter
Mercedes-Benz W 126, C 126, R 107



A22

Heating and air-conditioning test adapter
Mercedes-Benz W 126, C 126, R 107



6. Installation position of components

In vehicle types W 126 and C 126 the passenger-compartment temperature sensor is in the roof above the interior lamp (see top picture, arrow). Removal and installation is through the opening in the interior lamp.

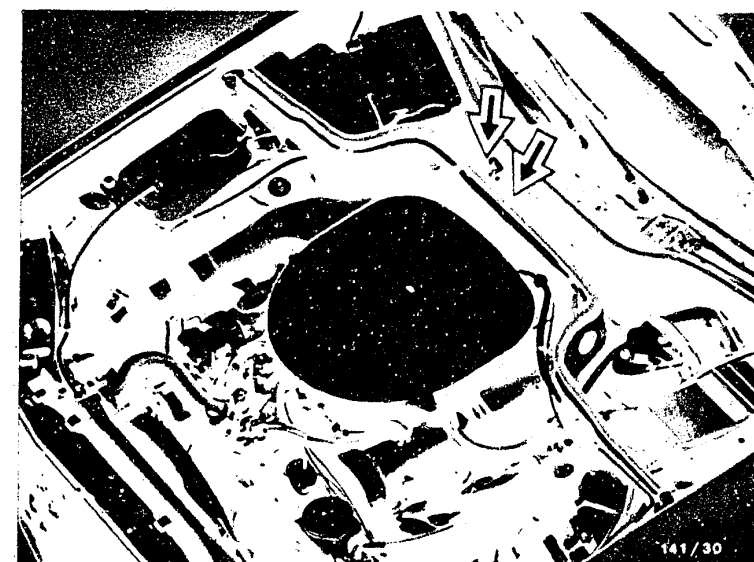
In vehicle type R 107 the passenger-compartment temperature sensor is in the centre of the instrument panel above the centre nozzles.
(For removal and installation it is necessary to remove the glove-compartment box).

The duo hot-water valve and the hot-water pump are in the special equipment compartment on the right-hand side as viewed in the forward direction of travel (see center picture, arrows).

Note: The hot-water pump is only standard in Type R107 and in all 8-cylinder models.

Electronic trigger box (temperature controller)

The electronic trigger box is below the glove compartment, behind the footwell panelling (see bottom picture, arrow).

**A23**

Installation position of components
Mercedes-Benz W 126, C 126, R 107

**A24**

Installation position of components
Mercedes-Benz W 126, C 126, R 107



Left-hand/right-hand heat exchanger sensors (types W 126, C 126)

Both sensors for the left-hand and right-hand heat exchanger sides are in the heater box (see top picture, arrows).

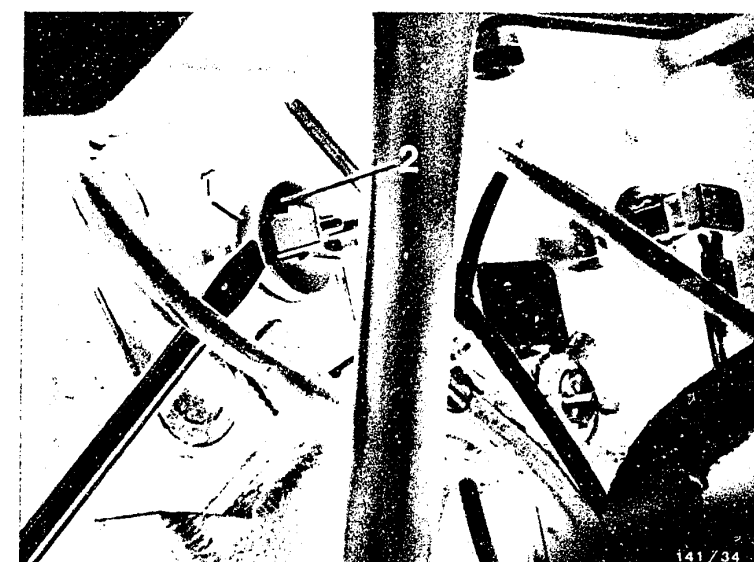
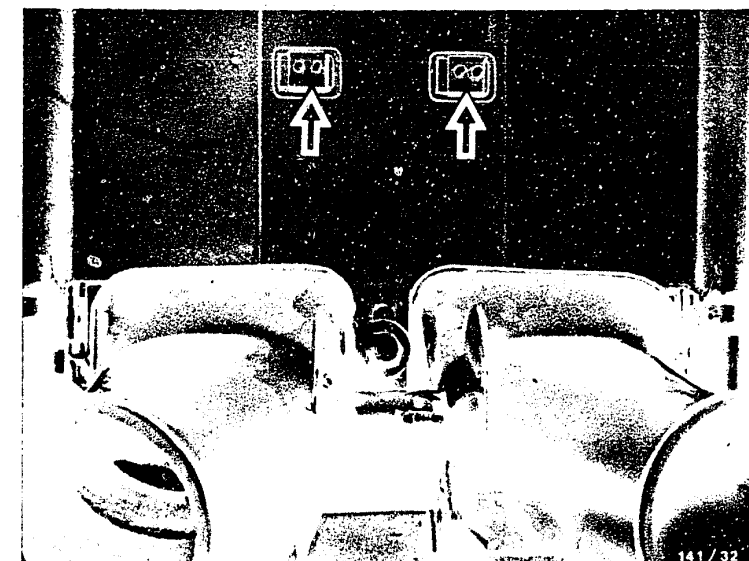
Note: The heat-exchanger sensors are only accessible after removing the centre console cover (ashtray, switch and radio must be removed).

Left-hand/right-hand heat exchanger sensors (type R 107, bottom picture)

These sensors consist of a guide tube (1) and the sensor (2). When removing a sensor with a screwdriver, apply the screwdriver only between the collar of the guide tube and the collar of the sensor (not between collar of guide tube and heater box since guide tube can only be properly fastened in place again by removing the entire heater box)!

Evaporator sensor (types W 126, C 126)

The evaporator temperature sensor is plugged into the evaporator housing with a guide tube like the exchanger sensors.



B1

Installation position of components
Mercedes-Benz W 126, C 126, R 107



B2

Installation position of components
Mercedes-Benz W 126, C 126, R 107



7. Trouble-shooting according to test steps

7.1 Test conditions

- Check the customer complaints
(Check operation of automatic heating and air-conditioning system in accordance with vehicle owner manual).
- Coolant level O.K.
- Refrigerant level O.K.
- Engine running and at normal operating temperature
- Electrical system (fuses, battery voltage) O.K.
- Blower-motor switch at position IIII/blower running at max. speed.
- Left-hand and right-hand temperature selector thumb-wheels approximately in centre position (22)
- Air-distributor switch on vehicle in position "footwell"
- Fresh air/circulated air switch in fresh air position
- Air-conditioning switch at position "a" (refrigerant compressor on)

In the detailed trouble-shooting starting on Coordinate B 6, go through the test steps one after the other.

Only if a malfunction is indicated, proceed with the trouble-shooting which is set out underneath the test steps.



7.2 Connection of adapter lead

Switch off ignition. Remove right-hand footwell panelling. To do this, loosen 5 screws (see top picture, arrows).

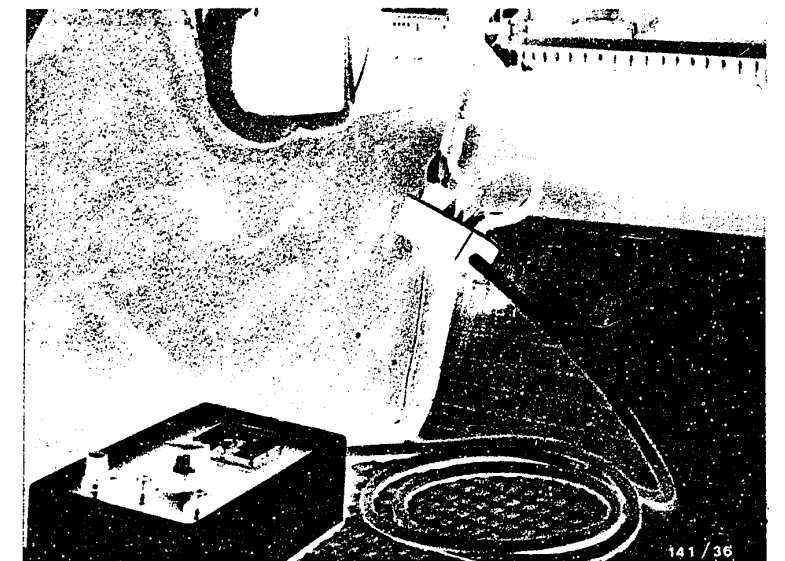
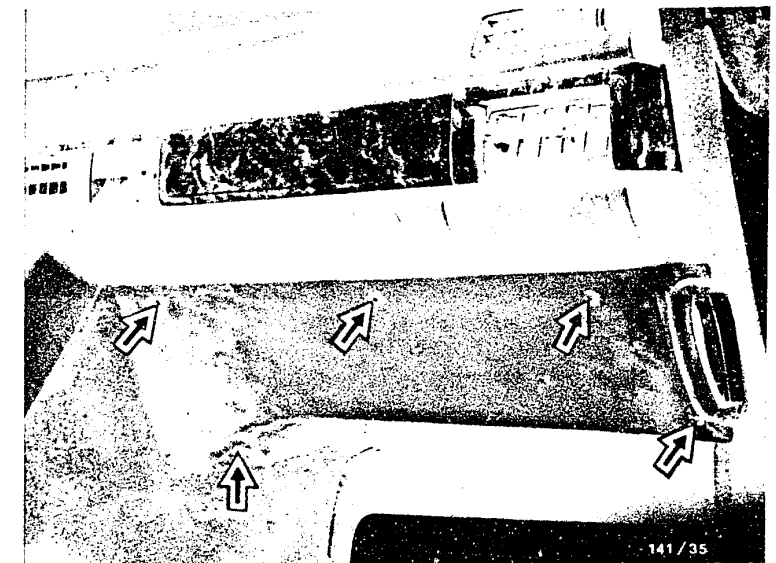
Remove trigger-box plug from electronic trigger box and connect to test adapter KDHK 0016 using adapter lead KDHK 0006 (see bottom picture).

Start engine.

Note

Carry out the trouble-shooting with the aid of the test chart.

If the connection between trigger-box plug and adapter lead or adapter lead and test adapter becomes undone, always first of all set the rotary switch on the test adapter to "0" and switch off the ignition.



C2

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



C3

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



Test step 1

Operation:
Speed switch position (S1) : 1

Measuring equipment:
Test adapter KDHK 0001

Measuring range: 0 ... 15

Operation in vehicle:
Engine running

Reading on test adapter:
10 ... 15

Testing of:
Electronic control unit power supply.

Test specification obtained?

no

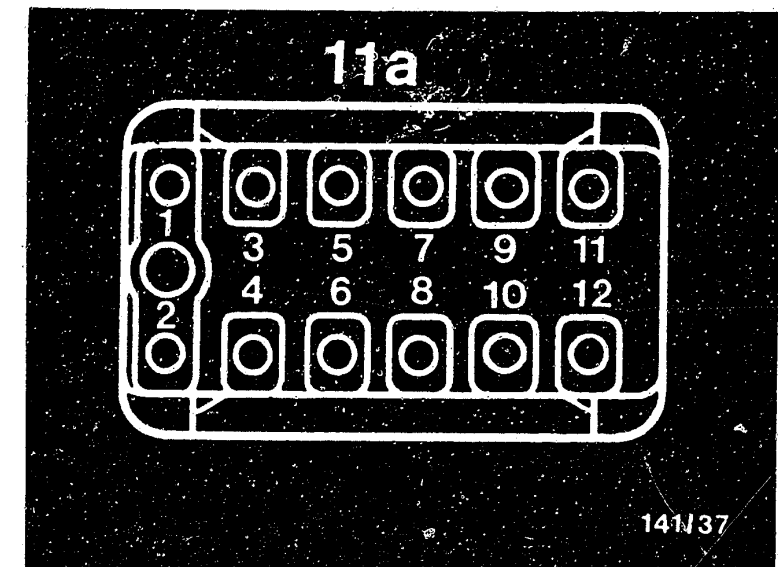
Trouble-shooting with multimeter:

Using voltmeter, check socket 9
against socket 6 on control-unit
plug (11a):
Reading: approx V_B

(Ignition on)

Reading not V_B :

Check fuses
Eliminate open circuit and/or con-
tact resistances at the leads.



11a=Control-unit plug

yes

C4

Trouble-shooting
Mercedes-Benz W 126, C 126, R 107



C5

Trouble-shooting
Mercedes-Benz W 126, C 126, R 107



Test step 2

Operation:

Speed switch position
(S1) : 2

Measuring equipment: Test
adapter

Measuring range: 0 ... 15

Operation in vehicle:

Engine running

Reading on test adapter

5 ... 11

Testing of:

Passenger-compartment
temperature sensor resistance

Test specification obtained?

no

Trouble-shooting with multimeter

Switch off ignition.

Using ohmmeter, check the following leads for continuity:

- from control-unit plug (11a) socket 10 to temperature-sensor plug (10a) socket "a"
- from control-unit plug (11a) socket 11 to temperature-sensor plug socket "b"

Reading should be: approx 0 Ω

- Check for short circuit at control-unit plug (11a) socket 10 to socket 11 (temperature-sensor plug disconnected).

Reading should be: approx $\infty\Omega$

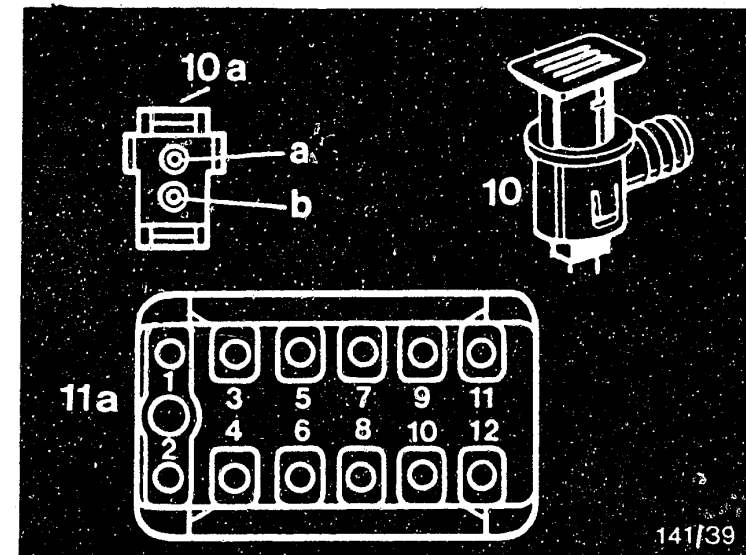
Eliminate contact resistances and/or open circuits on leads. Check passenger-compartment temperature sensor resistance between the pins of the temperature sensor:

Reading should be: approx 8 ... 16 k Ω

at approx +15...30°C at the temperature sensor.

Otherwise replace passenger-compartment temperature sensor.

yes



10 = Passenger-compartment
temperature sensor

10a = Passenger-compartment
temperature sensor plug

11a = Control-unit plug

C6

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



C7

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



Test step: 2.1

Operation:

Rotary switch position (S1) 2

Measuring equipment: Test adapter

Measuring range: 0 ... 15

Operation in vehicle: Engine running

Additional operation:

Spray refrigerant spray onto sensor (top picture)

Reading on test adapter:

Slowly falling

Testing of:

Passenger-compartment temperature sensor. (Change of resistance)

Does reading fall while cooling?

yes

Trouble-shooting with multimeter:

Switch off ignition.

Check passenger-compartment temperature sensor resistance between pins a and b

Reading should be: approx 8 ... 16 Ω
at approx +15...+30°C at the temperature sensor.

Spray passenger-compartment temperature sensor with refrigerant spray. Resistance must increase. If so, passenger-compartment temperature sensor is O.K.

Using ohmmeter, check the following leads for short circuit and open circuit:

- at control-unit plug (11a) socket 10 to temperature-sensor plug (10a) socket "a"

Reading should be: approx 0 Ω

- at control-unit plug (11a) socket 11 to temperature-sensor plug (10a) socket "b".

Reading should be: approx 0 Ω

Check leads for short circuit:

Ohmmeter at control-unit plug (11a) socket 10 to socket 11

Reading should be: $\infty \Omega$

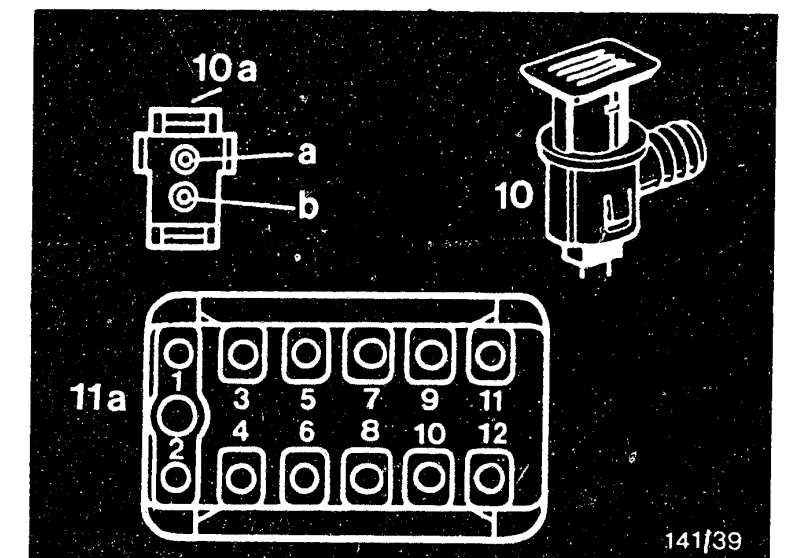
(Temperature-sensor plug disconnected)



10 = Passenger-compartment temperature sensor

10a = Passenger-compartment temperature sensor plug

11a = Control-unit plug



C8

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



C9

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



Test step: 2.2

Operation:

Rotary switch position (S1): 2

Measuring equipment:

Strip of paper or similar

Operation in vehicle:

Engine running

Blower switch at position IIII

Additional operation:

Hold strip of paper in front of air opening (see top picture).

Reading:

Strip of paper pulled in onto air opening.

Testing of:

Air intake through air opening of passenger-compartment temperature sensor

Is strip of paper pulled in?

no

Trouble-shooting:

Check hose between passenger-compartment temperature sensor housing and air jet for leak and security. The air jet is on the right behind the blower housing (see bottom picture, arrow).

Type C 126:

Check suction blower for passenger-compartment temperature sensor.

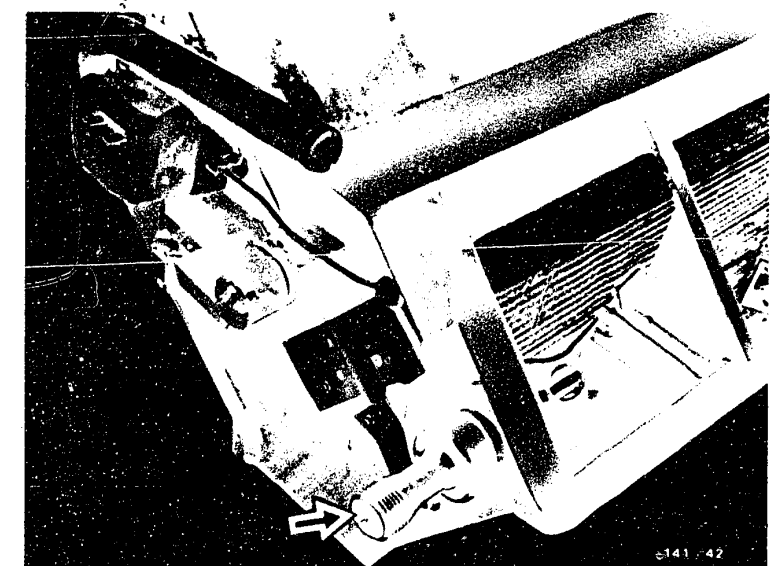
The suction blower is installed under the right-hand footwell covering.

Using voltmeter, check at suction blower plug term. 1 to term. 2.

(Ignition on)

Reading should be: approx U_B

Eliminate contact resistances and open circuits at the leads, or replace suction blower.



yes

C10

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



C11

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



Test step: 3

Operation:

Speed switch position (S1): 3

Measuring equipment: Test adapter

Measuring range: 0 ... 15

Operation in vehicle:

Engine running

Additional operation:

Turn left-hand temperature selector thumbwheel from "min" to "max".

Reading on test adapter

approx 1.5 ... 8

Min. approx 1

Max. approx 10

Reading must change uniformly between "min." and "max."

Note:

After testing, return temperature selector thumbwheel to center position.

Testing of

Left-hand temperature selector thumbwheel

Does reading change uniformly?

no

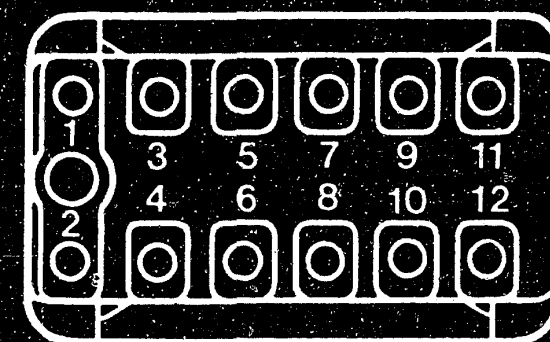
Trouble-shooting:

If reading jumps between latched positions "min." and "max." =

Temperature selector thumbwheel defective, replace.

If no reading, check for short circuit and open circuit in lead from control-unit plug (11a) socket 2 to temperature selector thumbwheel.

11a



141/37

11a = Control-unit plug

yes

C12

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



C13

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



Test step: 4

Operation:

Speed switch position (S1): 4

Measuring equipment: Test adapter

Measuring range: 0 ... 15

Operation in vehicle:

Engine running

Additional operation:

Turn right-hand temperature selector thumbwheel from "min" to "max".

Reading on test adapter

approx 1.5 ... 8

Min. approx 1

Max. approx 10

Reading must change uniformly between "min." and "max."

Note:

After testing, return temperature selector thumbwheel to center position.

Testing of

Right-hand temperature selector thumbwheel

Does reading change uniformly?

no

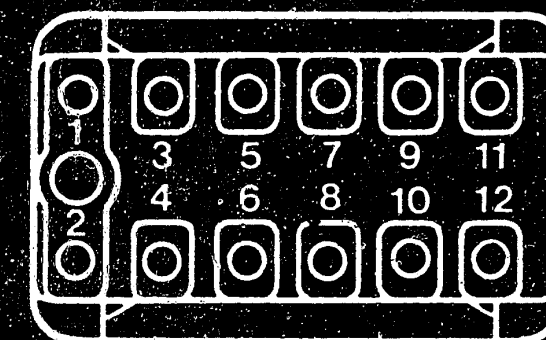
Trouble-shooting:

If reading jumps between latched positions "min." and "max." =

Temperature selector thumbwheel defective, replace.

If no reading, check for short circuit and open circuit in lead from control-unit plug socket 3 to temperature selector thumbwheel.

11a



141137

11a = Control-unit plug

yes

C14

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



C15

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



Test step: 5

Note:

Heating-water pump is installed as standard on type R 107 and all 8-cyl. models.

Operation:

Rotary switch position (S1): 6

Measuring equipment: Test adapter

Measuring range: 0 ... 15

Operation in vehicle:

Switch off engine. Switch on ignition.
Blower switch at position I

Additional operation:

Press auxiliary switch (S) on test adapter

Reading on test adapter

0 ... 3

By feeling/listening, check whether heating water pump running

Testing of:

Operation of heating water pump

Test specification obtained?

Heating water pump running?

yes

no

Trouble-shooting with multimeter

Using voltmeter at plug, check heating water pump socket "a" to ground (ignition on).

Reading should be: approx V_B

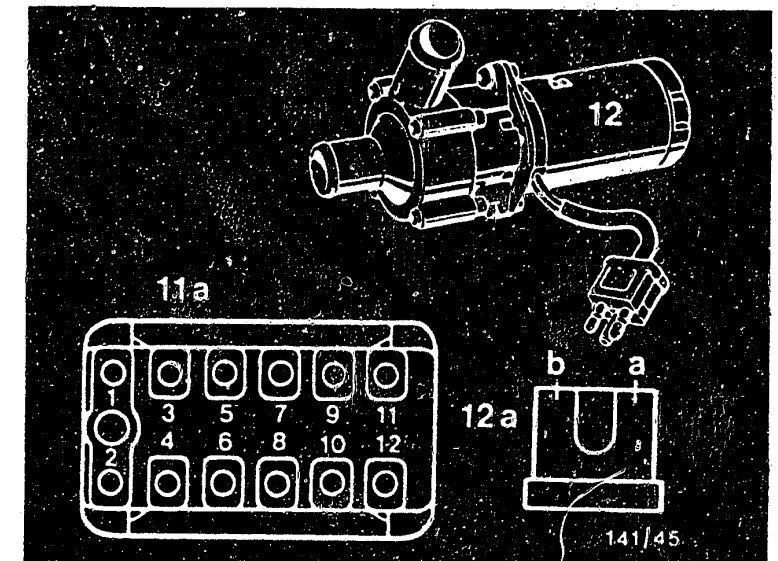
Switch off ignition.

Using ohmmeter, check lead from control-unit plug socket 4 to heating water pump plug socket "b".

Reading should be: approx 0Ω

Check leads for short circuit.

Eliminate open circuits/contact resistances at plug-in connections.



11a= Control-unit plug

12 = Heating water pump

12a= Plug to heating water pump

C16

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



C17

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



Test step: 5.1

Note:

Heating-water pump is installed as standard on type R 107 and all 8-cyl. models.

Operation:

Rotary switch position (S1): 6

Measuring equipment: Test adapter

Operation in vehicle:

Switch on ignition, blower switch at position I

Additional operation:

Press auxiliary switch (S) on test adapter once again (unlatch)

Reading on test adapter

9 ... 14

By feeling/listening, check that heating water is not running.

Testing of:

Operation of heating water pump

Test specification obtained?

Heating water pump no longer running?

yes

no

Trouble-shooting with multimeter

Switch off ignition.

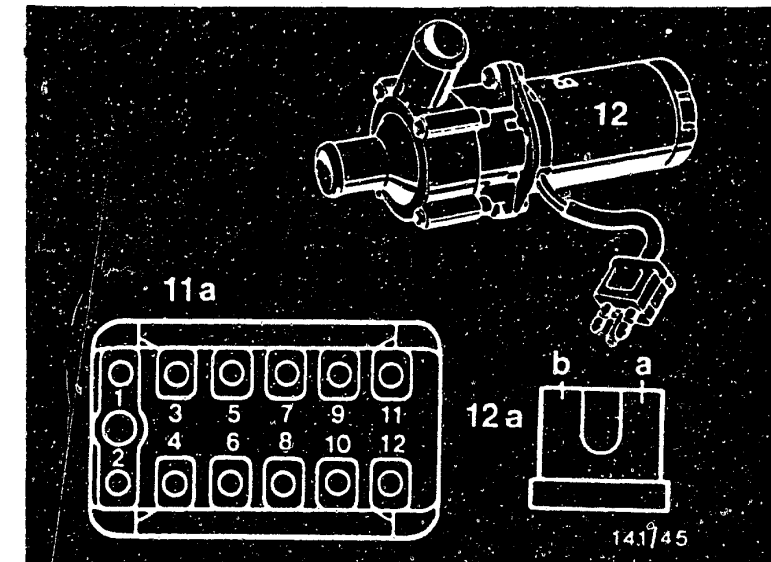
Disconnect plug from heating water pump.

Using ohmmeter, check from control-unit plug socket 4 to ground.

Reading should be: $\infty\Omega$

Check leads for short circuit.

Eliminate open circuits/contact resistances at plug-in connections.



11a=Control-unit plug

12 =Heating water pump

12a=Plug to heating water pump

C18

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



C19

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



Test step: 6

Operation:

Rotary switch position (S1): 7

Measuring equipment: Test adapter

Measuring range: 0 ... 15

Operation in vehicle:

Engine running

Additional operation:

Press auxiliary switch "S" on test adapter.

Reading on test adapter:

0 ... 3

By feeling, check that there is no heating effect on left.

Testing of:

Operation of left-hand heating water valve, closing of heating water inlet.

Test specification obtained?

No heating effect on left?

yes

no

Trouble-shooting with multimeter

Switch off ignition.

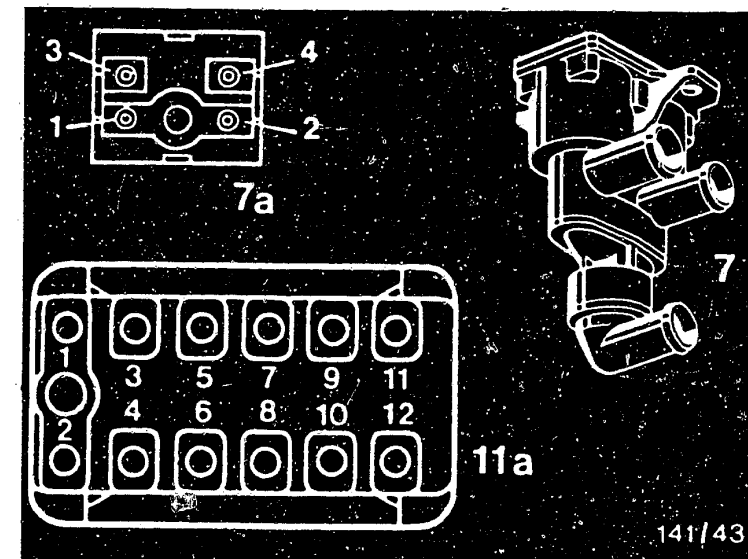
Using ohmmeter, check lead from control-unit plug (11a) socket 12 through left-hand temperature selector thumbwheel to duo heating water valve plug socket 4. (Temperature selector thumbwheel in position 22).

Reading: approx 0 Ω

Using voltmeter on duo heating water valve plug, check socket 2 to ground. Ignition on.

Reading: approx V_B

Check leads for short circuit. Eliminate open circuits/contact resistances at plug-in connections. Replace heating water valve.



7 = Duo heating water valve
7a = Plug for duo heating water valve
11a = Control-unit plug



Test step: 6.1

Operation:

Rotary switch position (S1): 7

Measuring equipment: Test adapter

Measuring range: 0 ... 15

Operation in vehicle:

Engine running

Additional operation:

Press auxiliary switch "S" on test adapter once again (unlatch).

Reading on test adapter:

9 ... 14

By feeling, check whether there is a heating effect on left.

Testing of:

Left-hand heating water valve.
Heating water inlet open.

Test specification obtained?

Heating effect present on left?

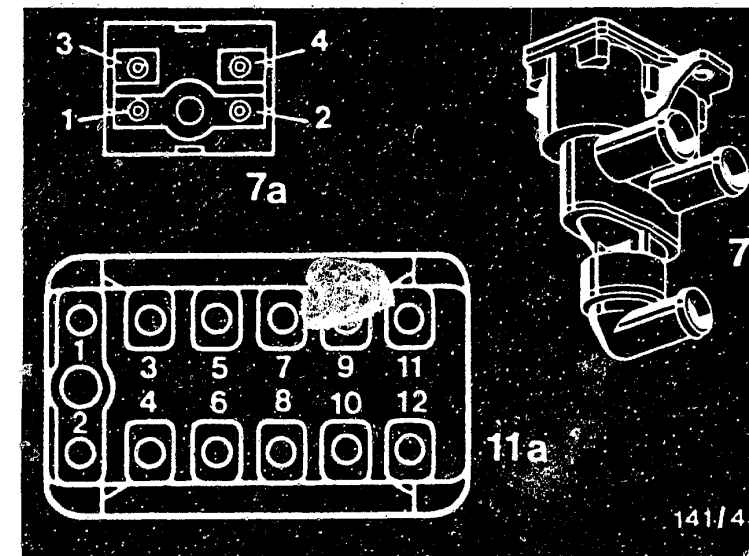
no

Trouble-shooting

1. No heating effect despite reading 9...14

Heating water valve electrically O.K., but mechanically defective.
Replace heating water valve.

2. Heating effect only at low engine speed. If system heats only at low engine speed, heating water valve is defective. Replace heating water valve.



7 =Duo heating water valve

7a=Plug for duo heating water valve

11a=Control-unit plug

yes

C22

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107

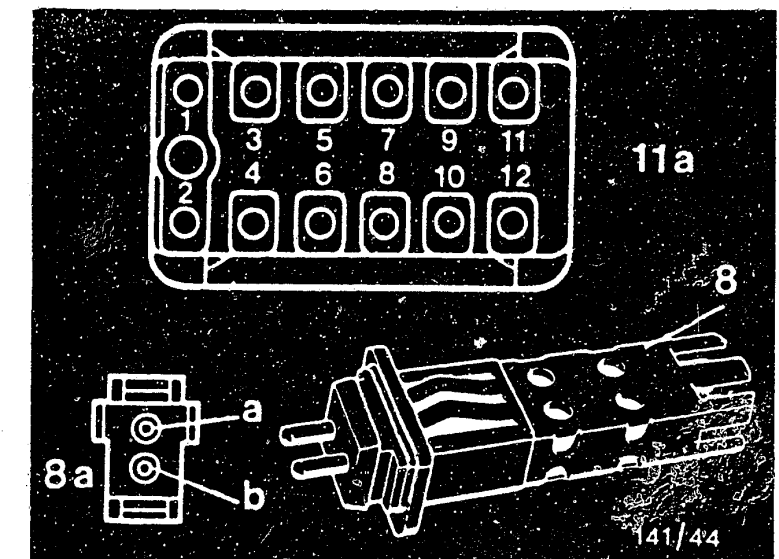


C23

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107





8 = Temperature sensor on heat exchanger
 8a = Plug for temperature sensor on heat exchanger
 11a = Control-unit plug

Test step: 7
 To follow immediately after test step 6.1.

Operation:
 Rotary switch position (S1): 8

Measuring equipment: Test adapter

Measuring range: 0 ... 15

Operation in vehicle:
 Engine running

Reading on test adapter:
 7 ... 12
 slowly falling

Testing of:
 Temperature sensor on left-hand heat exchanger.
 Change of resistance

Test specification obtained?
 Reading slowly falling?

yes

no

Trouble-shooting with multimeter:
 Ignition off.
 Using ohmmeter, check the following leads for continuity:
 From temperature sensor plug on heat exchanger socket a to control-unit plug (11a) socket 1.
 Reading should be: approx 0 Ω

From temperature sensor plug on heat exchanger socket b to control-unit plug (11a) socket 11
 Reading should be: approx 0 Ω

Check leads for short circuit:
 Using ohmmeter, check from control-unit plug (11a) socket 1 to socket 11.
 (Temperature sensor plug disconnected from heat exchanger).
 Reading should be: $\infty \Omega$

Check resistance of temperature sensor. Connect ohmmeter between pins:
 Reading should be: approx 8 ... 16 k Ω
 at approx +15...+30°C at temperature sensor.

Spray temperature sensor with refrigerant spray.
 If the resistance increases, temperature sensor is O.K.

Continued on C5/C6

D1

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



D2

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



Note:

If there is no reading "slowly falling", the heating water in the heat exchanger may possibly already have cooled down too much.

In this case, return rotary switch (S1) on test adapter for at least 15 seconds to position 7 (auxiliary switch (S) unlatched). Then continue with test step 7.

If necessary, eliminate open circuits/contact resistances at leads or plug-in connections. Replace temperature sensor on heat exchanger.

yes

Continued on C7/C8

D3

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



D4

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



Test step: 8

Rotary switch position (S1): 7

Measuring equipment: Test adapter

Measuring range: 0 ... 15

Operation in vehicle:
Engine running

Additional operation:
Press auxiliary switch "S" on test adapter.

Reading on test adapter:
0 ... 3

By feeling, check that there is no heating effect on right.

Testing of:
Operation of right-hand heating water valve, closing of heating water inlet.

Test specifications obtained?
No heating effect?

no

Trouble-shooting with multimeter

Switch off ignition.

Using ohmmeter, check lead from control-unit plug (11a) socket 5 through right-hand temperature selector thumbwheel to duo heating water valve plug socket 3.

(Temperature selector thumbwheel in position 22).

Reading: approx 0 Ω

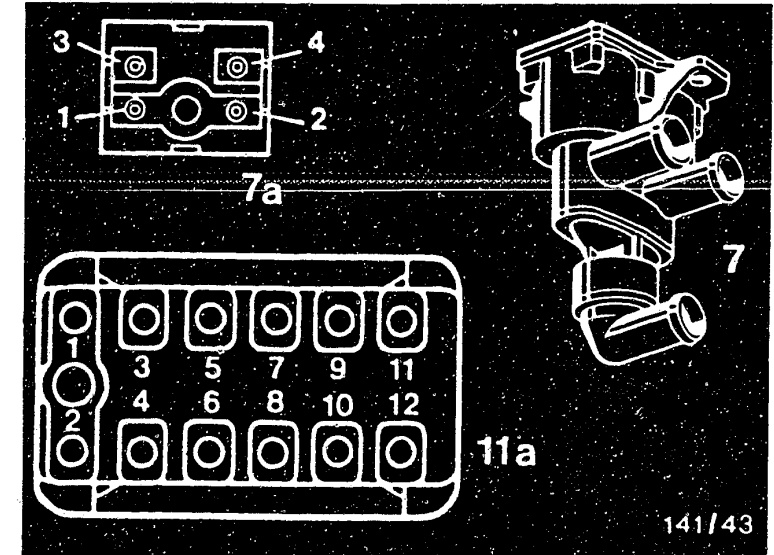
Using voltmeter on duo heating water valve plug, check socket 1 to ground. Ignition on.

Reading: approx V_B

Check leads for short circuit.

Eliminate open circuits/contact resistances at plug-in connections.

Replace heating water valve.



7 = Duo heating water valve
7a = Plug for duo heating water valve
11a = Control-unit plug

yes

D5

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



D6

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



Test step: 8.1

Operation:

Rotary switch position (S1): 9

Measuring equipment: Test adapter

Measuring range: 0 ... 15

Operation in vehicle:

Engine running

Additional operation:

Press auxiliary switch "S" on test adapter once again (un-latch).

Reading on test adapter:

9 ... 14

By feeling, check whether there is a heating effect on right.

Testing of:

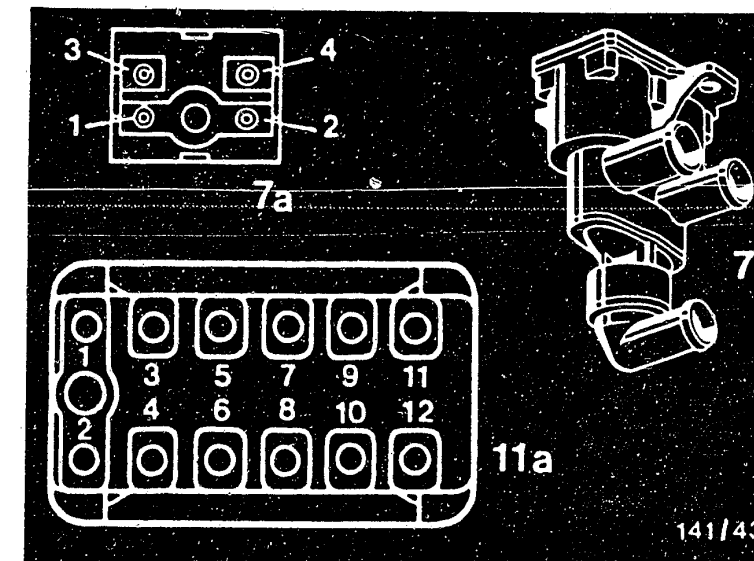
Right-hand heating water valve.
Heating water inlet open.

Test specifications obtained?
Heating effect present on right?

no

Trouble-shooting

1. No heating effect despite reading 9 ... 14
Heating water valve electrically O.K., but mechanically defective. Replace heating water valve.
2. Heating effect only at low engine speed. If system heats only at low engine speed, heating water valve is defective. Replace heating water valve.



7 =Duo heating water valve
7a=Plug for duo heating water valve
11a=Control-unit plug

yes

D7

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107

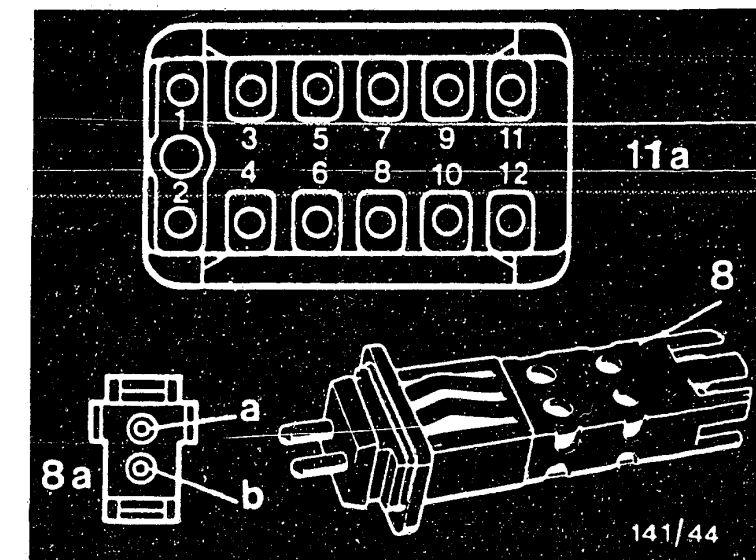


D8

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107





8 = Temperature sensor on heat exchanger
 8a = Plug for temperature sensor on heat exchanger
 11a = Control-unit plug

Test step: 9

To follow immediately after test step 8.1

Operation:

Rotary switch position: 10

Measuring equipment: Test adapter

Measuring range: 0 ... 15

Operation in vehicle:

Engine running

Reading on test adapter:

7 ... 12
 slowly falling

Testing of:

Temperature sensor on right-hand heat exchanger.
 Change of resistance.

Test specifications obtained?
 Reading slowly falling?

no

Trouble-shooting with multimeter:

Ignition off.

Using ohmmeter, check the following leads for continuity:

From temperature sensor plug on heat exchanger socket a to control-unit plug (11a) socket 8.

Reading should be: approx 0 Ω

From temperature sensor plug on heat exchanger socket b to control-unit plug (11a) socket 11

Reading should be: approx 0 Ω

Check leads for short circuit:

Using ohmmeter, check from control-unit plug (11a) socket 8 to socket 11.

Reading should be: approx $\infty \Omega$

Check resistance of temperature sensor. Connect ohmmeter between pins:

Reading should be: approx 8 ... 16 k Ω
 at approx +15...+30°C at temperature sensor.

Spray temperature sensor with refrigerant spray. If the resistance increases, temperature sensor is O.K.

yes

Continued on C13/C14

D9

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



D10

Trouble-shooting

Mercedes-Benz W 126, V 126, R 107



yes

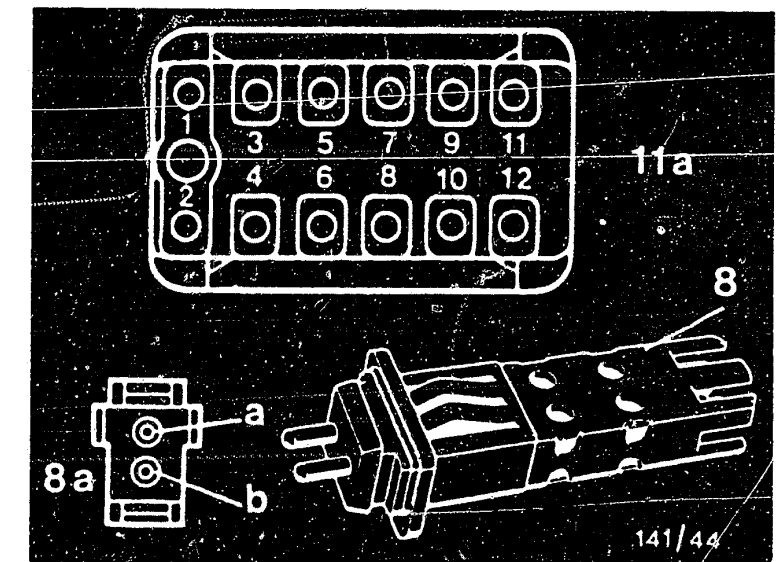
Note:

If there is no reading "slowly falling", the heating water in the heat exchanger may possibly already have cooled down too much.

In this case, return rotary switch (S1) on test adapter for at least 15 seconds to position 9 (auxiliary switch (S) unlatched).

Then continue with test step 9.

If necessary, eliminate open circuits/contact resistances at leads or plug-in connections. Replace temperature sensor on heat exchanger.



Continued on C15/C16

D11

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



D12

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



Test step: 10

Operation:
Rotary switch position (S1): 13

Measuring equipment: Test adapter

Measuring range: 0 ... 15

Operation in vehicle:
Air conditioning switch in position "a" (refrigerant compressor on)
Engine running

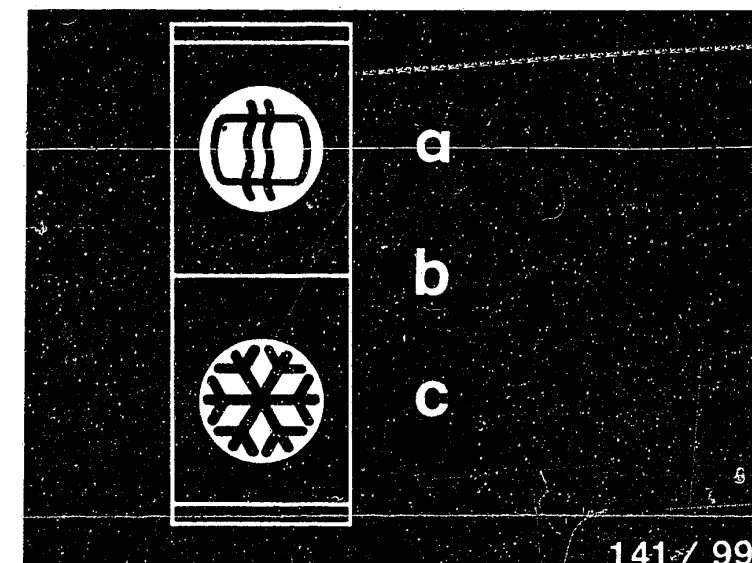
Reading on test adapter:
10 ... 15

Testing of: Operation of air conditioning switch (non-Bosch product) and leads

Test specification obtained?

no

Trouble-shooting with multimeter
Check for open circuit in leads from control-unit plug (11b) socket 4 to air conditioning switch pin 7. If lead O.K., try replacing air conditioning switch.



Air-conditioning switch

a = Compressor on

b = Compressor off

c = Compressor operates as required

yes

D13

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



D14

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



Test step: 10.1

Operation:

Rotary switch position (S1): 13

Measuring equipment: Test adapter

Measuring range: 0 ... 15

Operation in vehicle:

Air conditioning switch in position "b" (refrigerant compressor off)

Engine running

Reading on test adapter:

0 ... 3

Testing of:

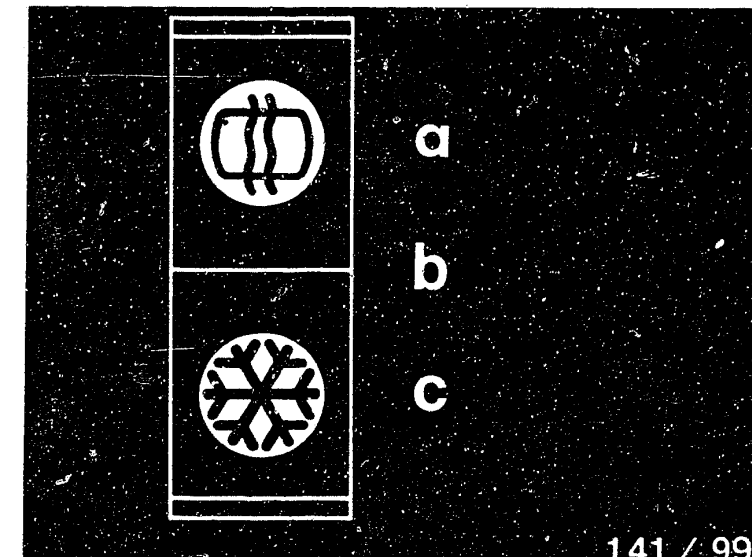
Operation of air conditioning switch (non-Bosch product) and leads

Test specification obtained?

no

Trouble-shooting with multimeter

Check for short circuit in lead from control-unit plug (11b) socket 4 to air conditioning switch pin 7. If lead O.K., try replacing air conditioning switch.



Air-conditioning switch

a = Compressor on

b = Compressor off

c = Compressor operates as required

yes

D 15

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



D 16

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



Test step: 10.2

Operation:

Rotary switch position (S1): 13

Measuring equipment: Test adapter

Measuring range: 0 ... 15

Operation in vehicle:

Air conditioning switch in position "c" (compressor operates as required). Engine running

Reading on test adapter:
0 ... 3

Testing of:

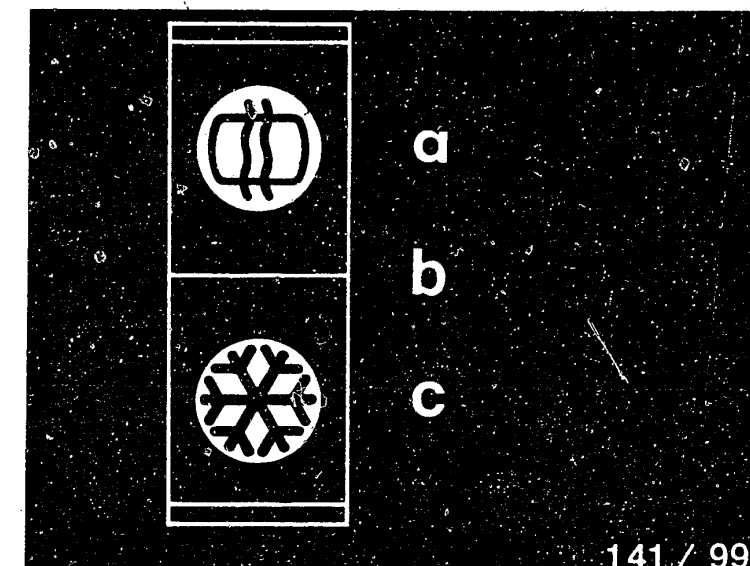
Operation of air conditioning switch (non-Bosch product) and leads.

Test specification obtained?

no

Trouble-shooting with multimeter

Check for short circuit in lead from control-unit plug (11b) socket 4 to air conditioning switch pin 7. If lead O.K., try replacing air conditioning switch.



Air-conditioning switch

a = Compressor on

b = Compressor off

c = Compressor operates as required

yes

D17

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



D18

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



Test step: 11

Rotary switch position (S1): 5

Measuring equipment: Test adapter

Measuring range: 0 ... 15

Operation in vehicle:

Air conditioning switch in position "a" (compressor on, see top picture)

Blower switch position IIII

Engine running

Reading on test adapter:

5 ... 12

Testing of:

Temperature sensor on evaporator. Resistance according to evaporator temperature.

Test specification obtained?

no

Trouble-shooting with multimeter:

Switch off ignition.

Using ohmmeter, check leads for continuity:

From control-unit plug socket 2 to plug on evaporator temperature sensor socket "a".

From plug on evaporator temperature sensor "b" to ground.

Reading should be: approx 0 Ω

Check leads for short circuit:

Connect ohmmeter to plug of evaporator temperature sensor between sockets a and b.

(Adapter lead disconnected from control-unit plug).

Reading should be: approx $\infty\Omega$

Check resistance of evaporator temperature sensor:

Connect ohmmeter between both pins.

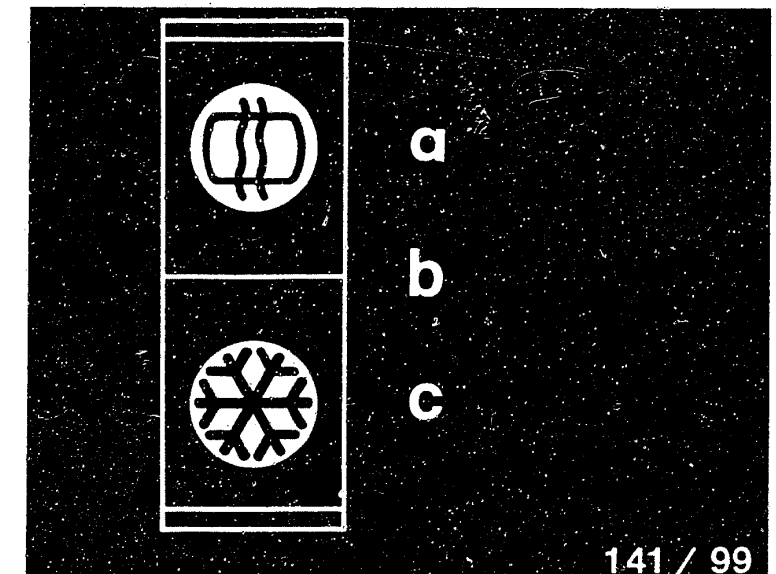
Reading should be: approx 2.5 ... 4.5 k Ω
at approx +15...+28°C at

temperature sensor.

Eliminate open circuits, short circuits/contact resistances at leads/plugs.

Replace evaporator temperature sensor.

yes



Air conditioning switch

a = Compressor on

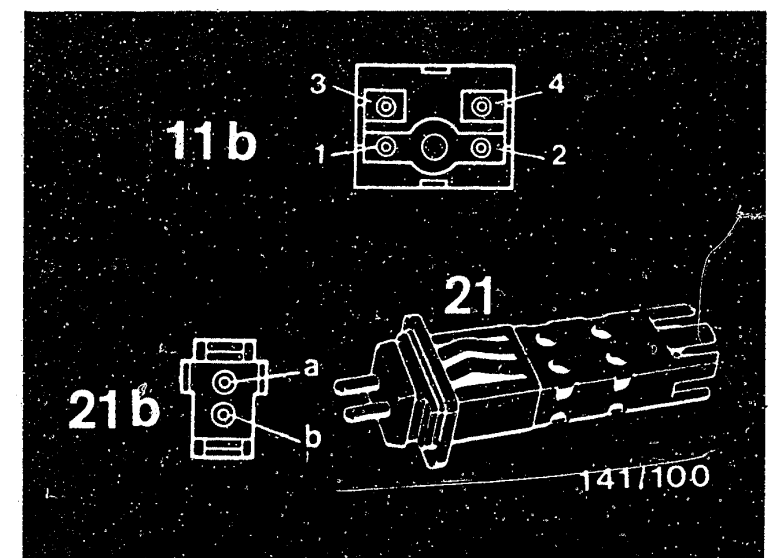
b = Compressor off

c = Compressor operating as required

11b = Control-unit plug

21 = Evaporator temperature sensor

21b = Plug on evaporator temperature sensor



D 19

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



D 20

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



Test step: 11.1

Operation:

Rotary switch position (S1): 5

Measuring equipment: Test adapter

Measuring range: 0 ... 15

Operation in vehicle:

Air conditioning switch at position "a" (compressor on, see center picture).

Blower switch at position IIII. Engine running.

Additional operation:

Press button (T) on test adapter

Reading on test adapter:

slowly falling.

(By feeling, check whether intake air is being greatly cooled).

Testing of:

Switching on of compressor clutch.

Change of resistance of temperature sensor on evaporator.

Reading slowly falling?

Intake air being cooled?

yes

no

Trouble-shooting:

Check refrigerant level.

Follow safety regulations when working with refrigerant.

Operate button "T" on test adapter several times. Compressor clutch must audibly pull in = electrically O.K. If not, trouble-shooting with multimeter:

Using voltmeter, check supply voltage for compressor clutch.

From control-unit plug (11b) socket 3 through icing-protection switch (18) and refrigerant compressor pressure switch (16) to compressor clutch

Reading should be: approx V_B

If V_B present at compressor clutch, clutch is defective.

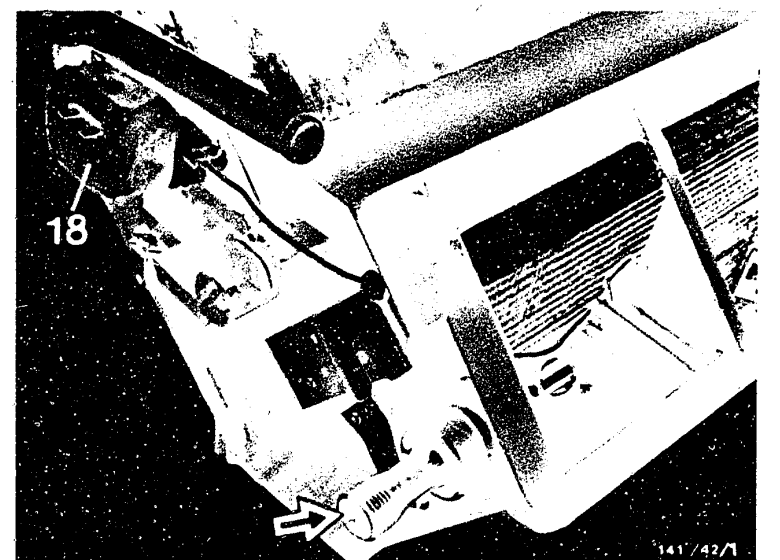
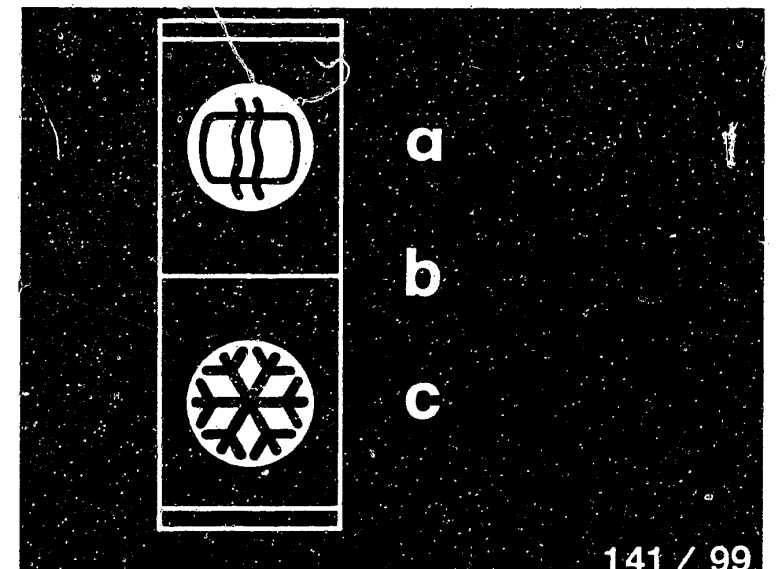
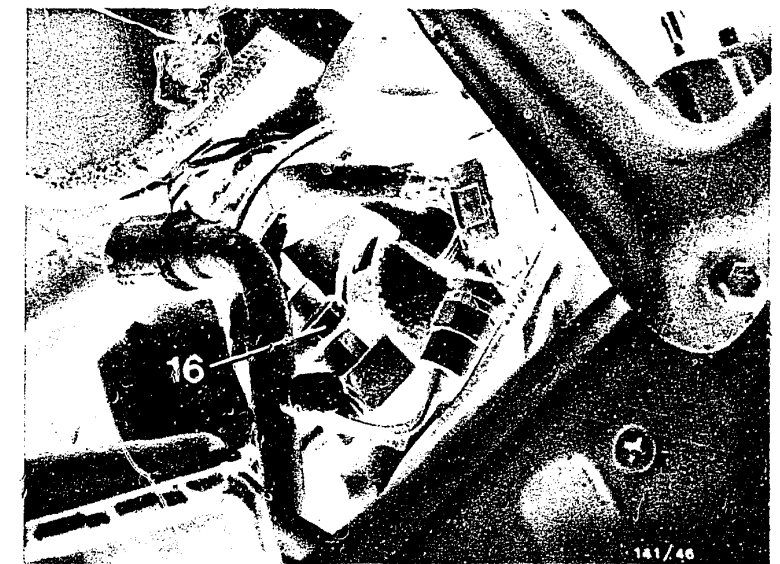
Note:

Icing-protection switch is only accessible after removing blower motor and air duct on right under instrument panel. Caution when removing/installing. Note precise installation position etc.

Fill up with refrigerant.

Repair power supply.

Replace compressor clutch.



D21

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



D22

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



Test step: 12
(not applicable for vehicles
with evaporator temperature sen-
sor)

Operation:

Rotary switch position (S1): 14

Measuring equipment: Test
adapter

Measuring range: 0 ... 15

Operation in vehicle:

Air conditioning switch at po-
sition "a" (compressor on, see
center picture).

Blower switch at position 4.
Engine running.

Additional operation:

Press button (T) on test adapter

Reading on test adapter:

Compressor operating
(By feeling, check whether in-
take air is being greatly
cooled).

Testing of:

Switching on of compressor
clutch.

Intake air being cooled?

yes

no

Trouble-shooting:

Check refrigerant level.

Follow safety regulations when working with re-
frigerant.

Operate button "T" on test adapter several times.
Compressor clutch must audibly pull in = electric-
ally O.K. If not,
trouble-shooting with multimeter:

Using voltmeter, check supply voltage for compres-
sor clutch.

From control-unit plug (11b) socket 3 through
icing-protection switch (18) and refrigerant com-
pressor pressure switch (16) to compressor clutch

Reading should be: approx V_B

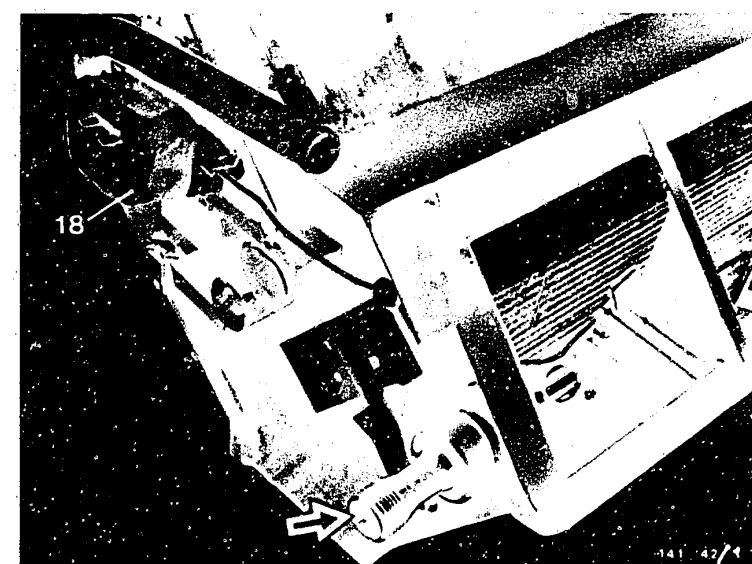
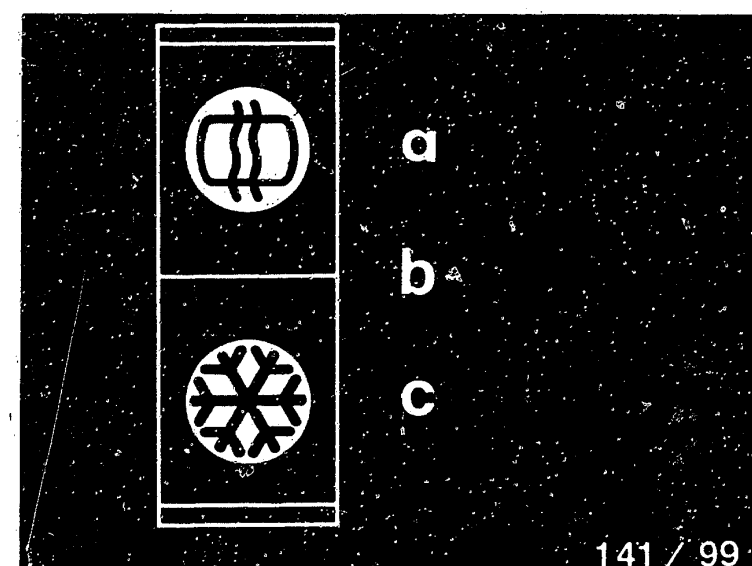
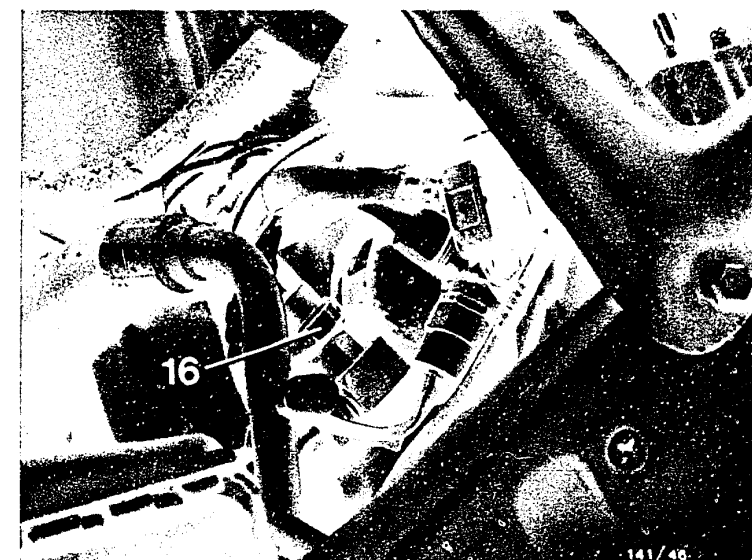
If V_B present at compressor clutch, clutch is
defective.

Note:

Icing-protection switch is only accessible after
removing blower motor and air duct on right under
instrument panel. Caution when removing/install-
ing. Note precise installation position etc.
Fill up with refrigerant.

Repair power supply.

Replace compressor clutch.



D23

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



D24

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



Test step: 13

Operation:

Rotary switch position (S1): 15

Measuring equipment: Test adapter

Measuring range: 0 ... 15

Operation in vehicle:

Blower switch at position IIII.
Engine running

Additional operation:

Air conditioning switch at position "b" (compressor off)

Reading on test adapter:

0 ... 3
(No voltage)

Testing of:

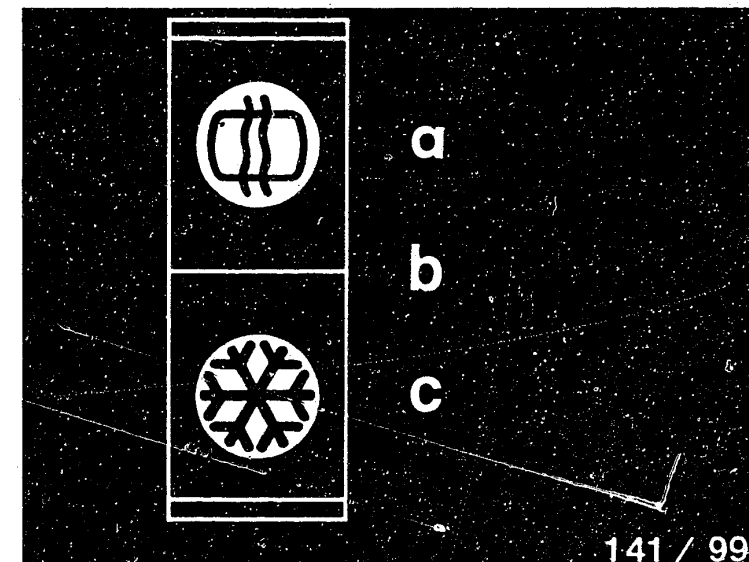
Power supply for compressor clutch (air conditioning switch)

Test specification obtained?

no

Trouble-shooting:

If reading > 3, try replacing air-conditioning switch (non-Bosch product).



Air conditioning switch

a = Compressor on

b = Compressor off

c = Compressor operates as required

yes

E1

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



E2

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



Test step 13.1

Operation:

Rotary switch position (S1): 15

Measuring equipment: Test adapter

Measuring range: 0 ... 15

Operation in vehicle:

Additional operation:

Air conditioning switch to position "c" (compressor operates as required)

Reading on test adapter:

10 ... 15

Testing of:

Compressor clutch power supply

Test specification obtained?

no

Trouble-shooting with multimeter:

Using voltmeter, from control-unit plug (11a) socket 6 to battery terminal 30

Reading should be: approx V_B

from control-unit plug (11b) socket 1 to ground

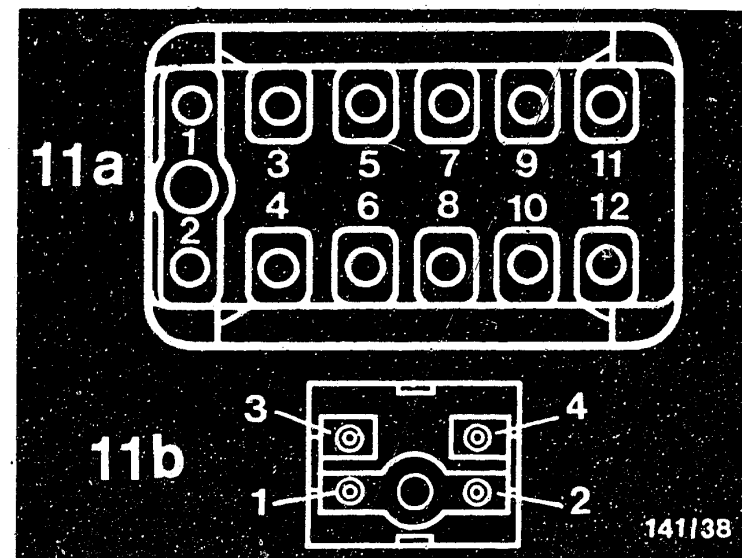
Reading should be: approx V_B

Possible fault if reading 0:

Open circuit/contact resistance in lead from fuse through blower switch, air conditioning switch pin 1 to control-unit plug (11b) socket 1, or blower switch or air conditioning switch not on.

Eliminate contact resistances at plug-in connections.

If reading greater than battery voltage, generator regulator is defective.



11a=Control-unit plug
12-pin

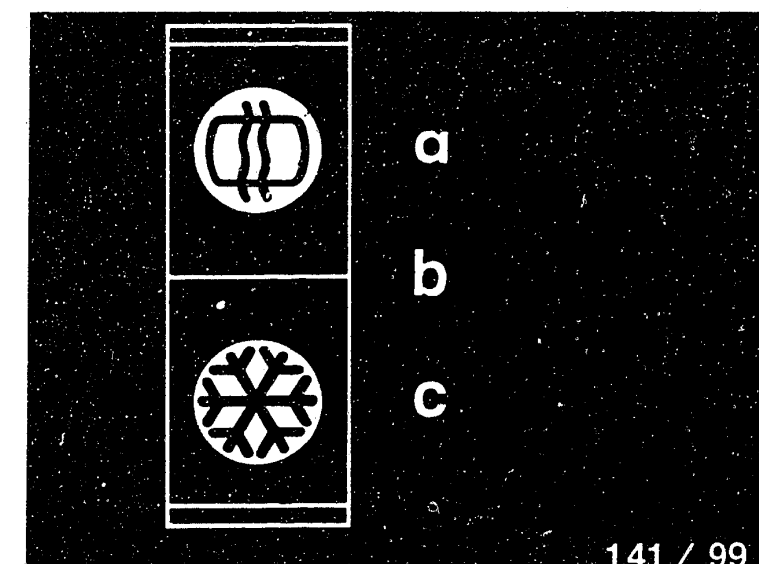
11b=Control-unit plug
4-pin

Air conditioning switch

a = Compressor on

b = Compressor off

c = Compressor operates as required



E3

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



E4

Trouble-shooting

Mercedes-Benz W 126, C 126, R 107



Test step: 13.2

Operation:
Rotary switch position (S1): 15

Measuring equipment: Test adapter

Measuring range: 0 ... 15

Operation in vehicle:
Engine running

Additional operation:
Air conditioning switch at position "a". (Compressor "ON")

Reading on test adapter:
10 ... 15

Testing of:
Compressor clutch power supply

Test specification obtained?

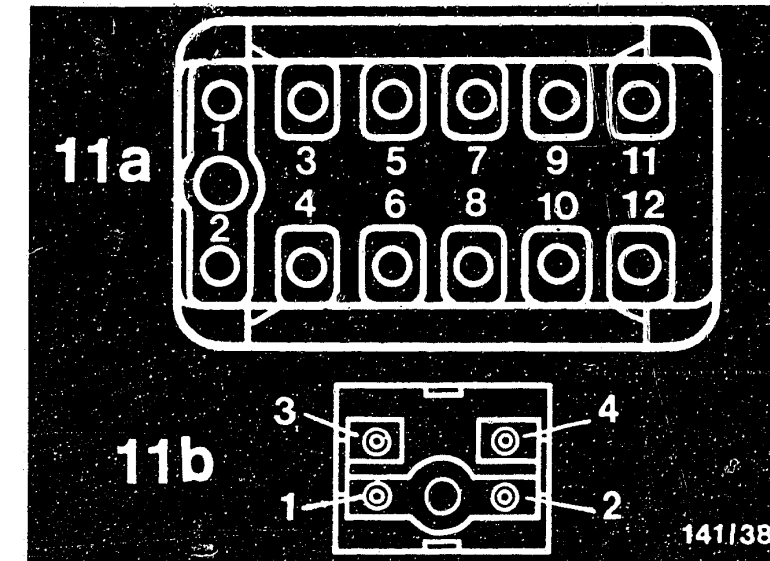
no

Trouble-shooting with multimeter:
Using voltmeter, from control-unit plug (11a) socket 6 to battery terminal 30
Reading should be: approx V_B

from control-unit plug (11b) socket 1 to ground
Reading should be: approx V_B

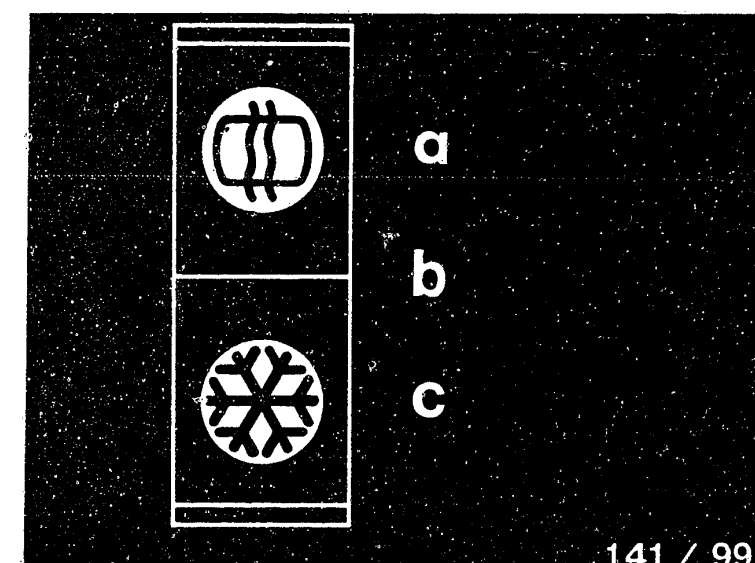
Possible fault if reading 0:
Open circuit/contact resistance in lead from fuse through blower switch, air conditioning switch pin 1 to control-unit plug (11b) socket 1, or blower switch or air conditioning switch not on.

Eliminate contact resistances at plug-in connections.
If reading greater than battery voltage, generator regulator is defective.



11a=Control-unit plug
12-pin
11b=Control-unit plug
4-pin

a = Compressor on
b = Compressor off
c = Compressor operates as required



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E5

Trouble-shooting
Mercedes-Benz W 126, C 126, R 107



E6

Trouble-shooting
Mercedes-Benz W 126, C 126, R 107



Set rotary switch (S1) on test adapter to "0".

Switch off ignition.

Disconnect adapter lead KDHK 0016 from control-unit plug.

If no fault has been found on the individual components by testing the automatic heating and air conditioning system with the test adapter, yet the air conditioning system is still malfunctioning, try replacing the electronic control unit for the automatic heating and air conditioning system.

Connect control-unit plug to electronic control unit. Then check the system once again according to the owner's manual for the vehicle.

Re-mount right-hand footwell cover.



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